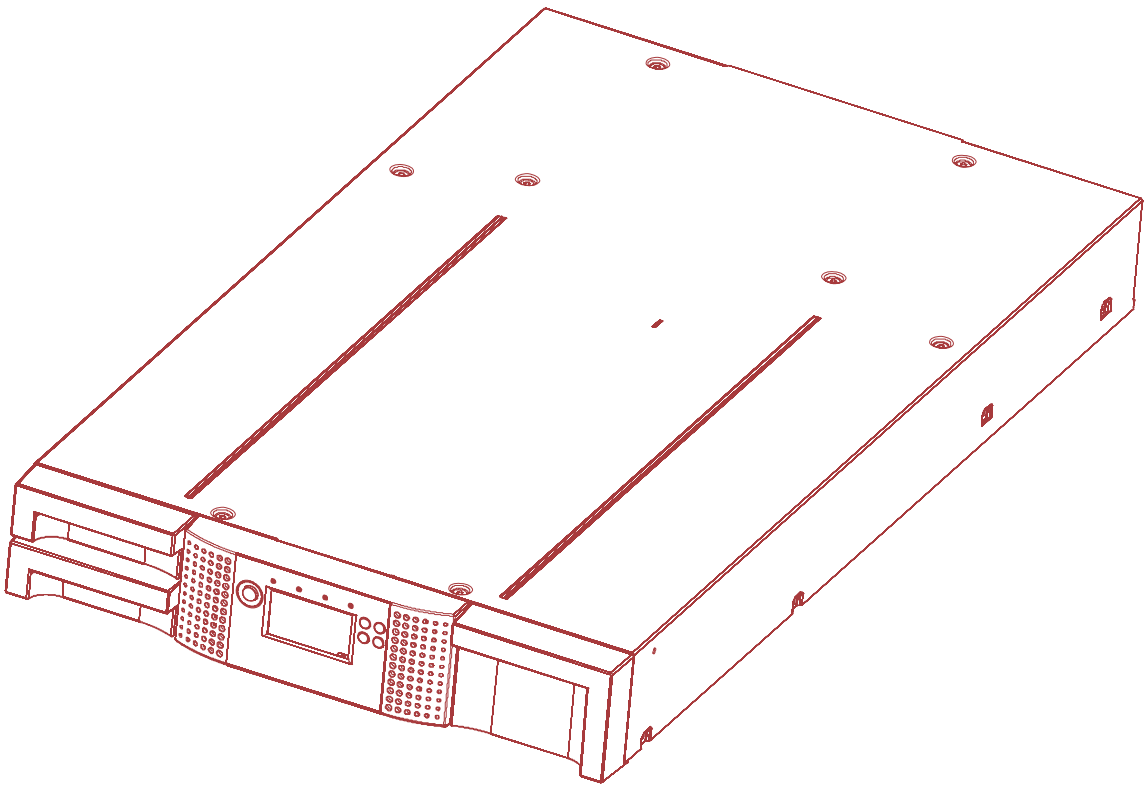
pivotstor

Automatic Protection (AP) Series TL2000 2U Tape Library

User and Service Guide



Copyright

Copyright 2007 by PivotStor, LLC. All rights reserved. This item and the information contained herein are the property of PivotStor, LLC. No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the express written permission of PivotStor, LLC.

Trademark Notices

PivotStor, LLC makes no representation or warranties with respect to the contents of this document and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Further, PivotStor, LLC reserves the right to revise this publication without obligation of PivotStor, LLC to notify any person or organization of such revision or changes.

Contacting PivotStor, LLC

USA

PivotStor, LLC
7274 Clairemont Mesa Blvd
San Diego, CA 92111
USA
858.279.7807

About this guide

This guide provides information about:

- Installing the AP Series TL2000 2U tape library
- Configuring and operating the AP Series TL2000 2U tape library
- Troubleshooting the AP Series TL2000 2U tape library
- Upgrading and servicing the tape library
- Installing the Optional Remote Management Unit (RMU)
- Installing the tape library in a Rack

Intended audience

This guide is intended for system administrators and general users who need physical and functional knowledge of the AP Series TL2000 2U tape library.

1 Warnings and symbols

IMPORTANT All safety and operating instructions should be read before this product is operated, and should be retained for future reference. This unit has been engineered and manufactured to assure your personal safety. Improper use can result in potential electrical shock or fire hazards. In order not to defeat the safeguards, observe the following basic rules for its installation, use and servicing.

DANGER **High voltage!**

Risk of electric shock.

Do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.

DANGER A danger condition due to the weight of the unit. Weight symbols are accompanied by an approximation of the product's weight.

CAUTION A discharge of static electricity can damage static-sensitive devices or micro circuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage.

NOTE Provides additional information.

- Ventilation – The product should be situated so that its location or position does not interfere with proper ventilation.
- Heat – The product should be situated away from heat sources such as radiators, heat registers, furnaces, or other heat producing appliances.
- Power sources – The product should be connected to a power source only of the type directed in the operating instructions or as marked on the product.
- Power cord protection – The AC line cord should be routed so that it is not likely to be walked on or pinched by items placed upon or against it, paying particular attention to the cord at the wall receptacle, and the point where the cord exits from the product.

- Object and liquid entry – Care should be taken to insure that objects do not fall and liquids are not spilled into the product's enclosure through openings.
- Servicing – The user should not attempt to service the product beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

1.1 Precautions

- Do not expose the unit to moisture. The operating temperature for this unit is between 10°C (50°F) and 35°C (95°F).
- Use the unit on a firm level surface free from vibration, and do not place anything on top of the unit.

1.2 Product Warranty Caution

The warranty for the tape library shall not apply to failures of any unit when:

- The tape library is repaired or modified by anyone other than the manufacturer's personnel or approved agent.
- The tape library is physically abused or used in a manner that is inconsistent with the operating instructions or product specification defined by the manufacturer.
- The tape library fails because of accident, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, modification, or service by anyone other than the factory service center or its approved agent.
- The tape library is repaired by anyone, including an approved agent, in a manner that is contrary to the maintenance or installation instructions supplied by the manufacturer.
- The manufacturer's serial number tag is removed.
- The tape library is damaged because of improper packaging on return.
- Unauthorized modifications to the unit configuration by the customer may result in loss of guarantee by the vendor.

1.3 Rack stability

WARNING To reduce the risk of personal injury or damage to equipment:

- Extend levelling jacks to the floor.
- Ensure that the full weight of the rack rests on the levelling jacks.
- Install stabilizing feet on the rack.
- In multiple-rack installations, secure racks together.
- Extend only one rack component at a time. Racks may become unstable if more than one component is extended.

2 Contents

1 Warnings and symbols 4
1.1 Precautions 5
1.2 Product Warranty Caution 5
1.3 Rack stability 5

2 Contents 6

3 Figures 8

4 Tables 10

5 Installing the tape library 11
5.1 AP Series tape library features and requirements 11
5.1.1 Maximum storage capacity and data transfer rate 11
5.2 SCSI requirements 12
5.3 SCSI host bus adapters (HBAs) 12
5.4 LUN scanning 12
5.4.1 Preparing the host 13
5.4.2 Verifying the connection 13
5.5 AP Series tape library overview 13
5.5.1 Front panel overview 13
5.5.2 Operator control panel buttons 14
5.5.3 Back panel overview 16
5.6 Installing the library 17
5.6.1 Choosing a location 17
5.6.2 Unpacking the tape library 17
5.6.3 Identifying product components 18
5.6.4 Removing the shipping lock 18
5.6.5 Rackmounting the library 20
5.6.6 Connecting the SCSI and power cable 22

6 Operating the tape library 24
6.1 Operating Modes 24
6.2 OCP Philosophy 24
6.3 Power-Up Display 24
6.4 Note about the LED's 26
6.5 Input Modes 26
6.5.1 Selectable predefined values 26
6.5.2 Toggle values 26
6.5.3 Numerical values 26
6.6 Power ON/OFF 27
6.7 OCP Menu Flow Charts 28
6.8 Tape cartridges 33
6.8.1 AP Series tape library cartridge type 33
6.8.2 Using and maintaining tape cartridges 33
6.8.3 Labeling tape cartridges 33
6.8.4 Write-protecting tape cartridges 35
6.8.5 Backward read compatibility 35
6.8.6 Barcode reader 35
6.8.7 Magazines 36
6.8.8 Inserting tape cartridges into a magazine 37
6.8.9 Mailslot 37

7 Remote management unit (RMU) 38
7.1 Overview 38
7.2 Operations available through the RMU 38

7.4 Login ... 39
7.5 Identity ... 40
Viewing static library information ... 40
Viewing static drive information ... 40
7.6 Status ... 41
Viewing dynamic library information ... 41
Viewing dynamic drive information ... 41
Viewing the tape cartridge inventory ... 42
7.7 Configuration ... 42
Changing the system configuration ... 42
Changing the drive configuration ... 43
Changing the network configuration ... 43
Changing the user names and password ... 44
Setting date/time ... 45
Setting error log mode ... 45
Setting event notification parameters ... 45
Restoring factory defaults ... 46
7.8 Operations ... 46
Moving media within the library ... 46
Determining current media inventory ... 47
Releasing and replacing magazines ... 47
7.9 Service ... 48
Performing general library diagnostics ... 48
Determining and updating firmware ... 48
Rebooting the library ... 49
Viewing library logs ... 49
Cleaning tape drive(s) ... 50

8 Servicing the tape library ... 51
8.1 Possible tools needed ... 51
8.2 Electrostatic Discharge ... 51
8.3 Removing and replacing a tape drive ... 52
8.4 Removing and replacing a power supply ... 54
8.5 Removing and replacing the library controller ... 55
8.6 Removing and replacing the base chassis ... 56

9 Troubleshooting ... 58
9.1 Installation problems ... 58
9.2 Troubleshooting table ... 59
9.3 Service Procedures ... 62
Removing stuck tapes from slots ... 62
Removing and replacing a magazine using the OCP ... 63
Using the remote management unit ... 64
Magazine emergency release ... 65
9.4 Tape library error codes ... 66

10 Technical specifications ... 72
10.1 Physical AP Series tape library specifications ... 72
10.2 Tape library operation specifications ... 72
10.3 Environmental specifications ... 73

11 Regulatory Information ... 74

12 Index ... 76

3 Figures

Figure 1 Front panel overview 13
Figure 2 LED's 14
Figure 3 Back panel overview with a full height LTO3 FC tape drive 16
Figure 4 Back panel overview with one half height LTO3 SCSI tape drive 16
Figure 5 Back panel overview with two half height LTO3 SCSI tape drives 16
Figure 6 Shipping lock and label 19
Figure 7 Shipping lock and label on the rear panel 19
Figure 8 Shipping lock before transportation 19
Figure 9 Installing the rails into the rack 20
Figure 10 Installing the mounting brackets and guide pulleys 21
Figure 11 Securing the library to the rack 22
Figure 12 Attaching the SCSI cable to the LTO3 full height drive 22
Figure 13 Attaching the terminator to the LTO3 full height drive 23
Figure 14 Attaching the power cable 23
Figure 15 Start-Up Screen 25
Figure 16 Home Screen 25
Figure 17 OCP User interaction Mode 28
Figure 18 Interaction Mode, Information 29
Figure 19 Interaction Mode, Commands 30
Figure 20 Interaction Mode, Configuration 31
Figure 21 Interaction Mode, Service 32
Figure 22 Ultrium tape cartridge and proper bar code label placement 34
Figure 23 Write-protecting the Ultrium data cartridge 35
Figure 24 Left magazine 36
Figure 25 Right magazine 36
Figure 26 Slot numbering left magazine 37
Figure 27 Handling mailslot 37
Figure 28 Slot numbering right magazine 37
Figure 29 RMU login page 39
Figure 30 Identity: library page 40
Figure 31 Identity: drive page 40
Figure 32 Status: library page 41
Figure 33 Status: Drive page 41
Figure 34 Status: Inventory page 42
Figure 35 Configuration: System page 43
Figure 36 Configuration: Drive page 43
Figure 37 Configuration: Network page 44
Figure 38 Configuration: User page 44
Figure 39 Configuration: Date/Time page 45
Figure 40 Configuration: Log page 45
Figure 41 Configuration: Event notification page 46
Figure 42 Configuration: Restore defaults page 46
Figure 43 Operations: Move Media page 47
Figure 44 Operations: Inventory page 47
Figure 45 Operations: Magazines page 47
Figure 46 Service: General Diagnostic page 48
Figure 47 Service: Firmware page 48
Figure 48 Service: Reboot page 49
Figure 49 Service: Library Logs page 50
Figure 50 Service: Clean drive page 50
Figure 51 Drive sled components of rear panel 52
Figure 52 Tape drive removal 53
Figure 53 Installing a tape drive 53
Figure 54 Position of the three thumbscrews 54
Figure 55 Power supply removal 54

Figure 56 Position of the two thumbscrews 55
Figure 57 Library controller removal.....55
Figure 58 Removing stuck tapes from slot.....63
Figure 59 RMU login page.....64
Figure 60 Operations: Magazines page 64
Figure 61 Access holes for the left and right magazine.....65
Figure 62 Releasing the magazine.....65

4 Tables

Table 1 *LTO3 HH tape library specifications* 11
Table 2 *LTO3 FH tape library specifications* 11
Table 3 *Front panel description* 13
Table 4 *LED descriptions* 15
Table 5 *Back panel description* 16
Table 6 *Location criteria* 17
Table 7 *Status icons* 39
Table 8 *Troubleshooting table* 59
Table 9 *Access to manually release a magazine* 65
Table 10 *Removing the left magazine* 66
Table 11 *Main Error codes* 67
Table 12 *AP Series tap library physical specifications* 72
Table 13 *Operation specifications* 72
Table 14 *Tape library Environmental Specifications* 73

5 Installing the tape library

5.1 AP Series TL2000 2U tape library features and requirements

The AP Series tap library provides a compact, high-capacity, low-cost solution for simple, unattended data backup. This unique design houses up to 24 tape cartridges in a compact 2U form factor with easy access to tape cartridges via two removable magazines and a mailslot. The magazines can hold up to twelve (left magazine including mailslot) and twelve (right magazine) cartridges.

The library can support one or two LTO3 half height tape drives, one LTO3 full height tape drive or one LTO4 full height tape drive. The library occupies one SCSI target address (for the single drive version) and uses dual LUNs for the tape drive and library robotic.

The AP Series tape library is compatible with most operating systems and environments that support the SCSI interface. However, the library requires either direct support from the operating system or a compatible backup application to take full advantage of its many features.

Maximum storage capacity and data transfer rate

Maximum storage capacity and maximum data transfer rates are as follows:

Table 1 *LTO3 HH tape library specifications*

CHARACTERISTIC	SPECIFICATION
Maximum storage capacity, 24 data cartridges	Native: 9.6 TB (24 x 400 GB) Compressed: 19.2 TB (2:1 compression)
Maximum data transfer rate - one drive	Native: 60 MB/s (216 GB/hr.) Compressed: 120 MB/s (432 GB/hr.) (2:1 compression)
Maximum data transfer rate - two drives	Native: 120 MB/s (432 GB/hr.) Compressed: 240 MB/s (864 GB/hr.) (2:1 compression)

Table 2 *LTO3 FH tape library specifications*

CHARACTERISTIC	SPECIFICATION
Maximum storage capacity, 24 data cartridges	Native: 9.6 TB (24 x 400 GB) Compressed: 19.2 TB (2:1 compression)
Maximum data transfer rate - one drive	Native: 80 MB/s (288 GB/hr.) Compressed: 160 MB/s (576 GB/hr.) (2:1 compression)

Table 3 *LTO4 FH tape library specifications*

CHARACTERISTIC	SPECIFICATION
Maximum storage capacity, 24 data cartridges	Native: 19.2 TB (24 x 800 GB) Compressed: 38.4 TB (2:1 compression)
Maximum data transfer rate - one drive	Native: 120 MB/s (432 GB/hr.) Compressed: 240 MB/s (864 GB/hr.) (2:1 compression)

5.2 SCSI requirements

The AP Series tap library incorporates a wide SCSI-2 or SCSI-3 Low-Voltage Differential (LVD) SCSI bus, but may also be attached to a Single-Ended (SE) SCSI bus. Make sure your SCSI host adapter or controller supports these standards. If you connect the library to an SE SCSI bus, or if there are SE devices attached to the same SCSI bus, the library's performance is limited to the maximum data transfer speed and maximum cable lengths of the SE bus. For these reasons, PIVOTSTOR, LLC strongly recommends that you do not use a SE SCSI bus with the library.

IMPORTANT: Do not connect an LTO3 device to a SE SCSI bus, as it will severely degrade performance.

IMPORTANT: The AP Series tape library is NOT compatible with a standard differential (Diff) or High-Voltage Differential (HVD) SCSI bus. This library is compatible with a narrow (50-pin) SCSI bus using a 68-pin to 50-pin adapter that terminates the unused 18 pins (Not included with the library). These adapters are sometimes labeled high-byte termination.

5.3 SCSI host bus adapters (HBAs)

To get optimum performance from your AP Series tape library you need a SCSI bus that can transfer data at a rate that supports the library's maximum burst transfer speed, see "Maximum storage capacity and data transfer rate" on page 11.
If necessary, install a SCSI host adapter, software, and compatible driver(s). Refer to the manuals for the host computer and the SCSI host adapter for detailed information.

A single-ended SCSI host bus adapter will severely degrade performance and limit cable length. Also, if there is any SE devices on the same SCSI bus, the entire SCSI bus will negotiate down to SE speed, severely degrading performance.

5.4 LUN scanning

The AP Series tape library uses a single SCSI ID per drive and dual LUNs to control the tape drive (LUN 0) and library robotic (LUN 1). The library requires an HBA that supports LUN scanning. If it is not enabled, your host system will not scan beyond LUN 0 and will fail to discover the library. It will just see the tape drive.

IMPORTANT: Some HBAs, such as RAID controllers, do not support LUN scanning.

Preparing the host

IMPORTANT: Use proper procedures to prevent electrostatic discharge (ESD) (see use wrist-grounding straps and anti-static mats when handing internal components.

Follow these general guidelines:

- Make sure that your backup application supports the SCSI host bus adapter.
- If the host server is connected to a network, check with the system administrator before turning off power.
- Install a suitably rated HBA. Remember that if there are any SE devices on the same SCSI bus, the entire SCSI bus will negotiate down to SE speed and severely degrade performance and limit cable length.
- Make sure that LUN scanning is enabled on the SCSI host adapter.

Verifying the connection

- Depending on the server configuration, you may need to change the SCSI IDs of the library.
- When the host server is powered on, install the software and/or driver(s) that are compatible with the library. Backup software packages may require additional software or licensing to communicate with the library robotics.
- Ensure the library is properly terminated. If the library is the only SCSI device, other than the SCSI host adapter on the selected SCSI bus, it must be terminated. Likewise, if the library is physically the last SCSI device on the SCSI bus, it must be terminated. Only the devices physically located at the beginning and end of the SCSI bus should be terminated.
- Confirm the host server's operating system recognized the library in Microsoft® In Windows® XP, Windows® Server 2003 or in Windows 2000® by going to: Settings > Control Panel > System > Hardware > Device Manager > Tape Drive and/or Media Changer.

For more information on verifying the connection of SCSI devices, consult the operating system documentation.

5.5 AP Series tape library overview

Front panel overview

The front panel of the AP Series tape library provides access to the power button, operator control panel, left and right magazines, Led's, and the mailslot.

Figure 1 *Front panel overview*

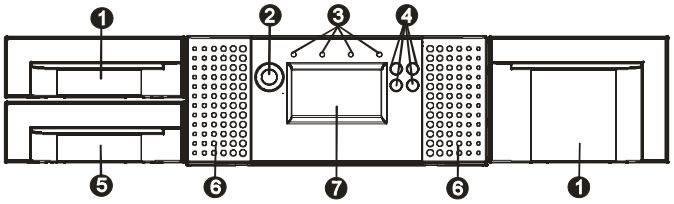


Table 4 *Front panel description*

Number	Description

1	Magazines
2	Power button (no power switch or button can be found on the back panel of the library)
3	Front panel LED's
	■ Ready/Activity ■ Clean Drive ■ Media Attention ■ Error
4	Control keys
	■ Cancel ■ Previous ■ Next ■ Enter
5	Mailslot
6	Air vents
7	Front panel LCD screen

Operator control panel buttons

The Operator panel consists of an LCD display with a 128 x 64 character matrix, 4 push button switches and a power on/off button. The circuitry to illuminate external LED's has also been incorporated into the current level of hardware.

Figure 2 *LED's*

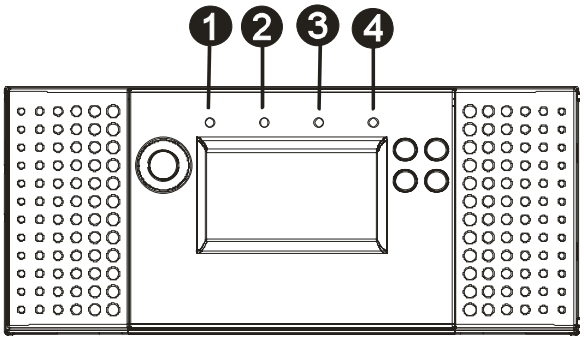


***Table 5** LED descriptions*

Number	LED	Color	Description
1	Ready (Activity)	Green	Illuminated when power is on. Blinking when there is tape or library robotics activity.
2	Clean (Drive)	Amber	Illuminated when the tape drive has determined that a cleaning cartridge should be used. Cleaning is only necessary when the library directs you to do so. Additional cleaning is not necessary.
3	Attention (Media)	Amber	Illuminated if the library has detected a condition that requires attention by the operator.
4	Error	Amber	Illuminated if an unrecoverable tape drive or library error occurs. A corresponding error message displays on the LCD screen (see for more information).

- **OCP** display, consisting of 128 x 64 characters
  The OCP screen displays actions and status information, menu items or error messages equivalent to the operation mode.
- **READY/ACTIVITY**, Green LED
  The READY/ACTIVITY LED is lit any time the unit is powered on and able to function. It will blink whenever there is library or drive activity.
- **CLEAN DRIVE**, Amber LED
  The CLEAN DRIVE LED will be lit when the drive is to be cleaned. The LED will be turned off after the tape drive is cleaned successfully.
- **MEDIA ATTENTION**, Amber LED
  The MEDIA ATTENTION LED will be lit when there has been a failure that indicates that there is a piece of media that is bad, marginal or invalid. It will be cleared when all invalid cartridges have been exported from the tape library.
- **ERROR**, Amber LED
  The ERROR LED will be lit when there is an unrecoverable library or drive failure. A message is displayed at the same time on the screen. It will be cleared when the error state is resolved.
- **ENTER**, button [↵]
  The ENTER button to go to a sub menu or execute an action.
- **NEXT**, button [>]
  The NEXT button is used to navigate through menu items.
- **PREVIOUS**, button [<]
  The PREVIOUS button is used to navigate backward through menu items.
- **CANCEL**, button [X]
  The CANCEL button is used to cancel a user action and return to the last menu item.
- **POWER ON/OFF**
  Pressing the POWER ON/OFF button will initiate a controlled Power Down of the unit (soft power down).

Back panel overview

The back panel of the library provides access to SCSI connectors, tape drive bays, the power connector, Ethernet, serial and the USB port. Figure 3, Figure 4, and Figure 5 show the back panel of a library with a full height LTO3 tape drive, a library with a single half height LTO2 tape drive, and a library with two half height LTO2 tape drives.

Figure 3 *Back panel overview with a full height LTO3 FC tape drive*

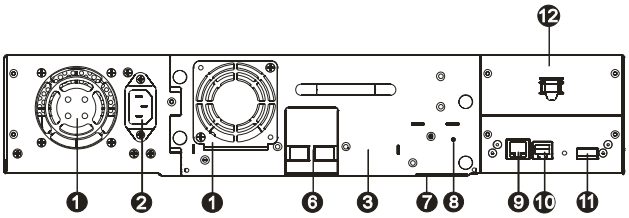


Figure 4 *Back panel overview with one half height LTO3 SCSI tape drive*

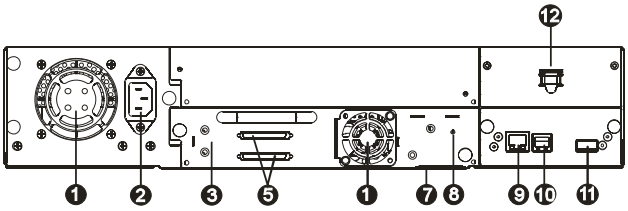


Figure 5 *Back panel overview with two half height LTO3 SCSI tape drives*

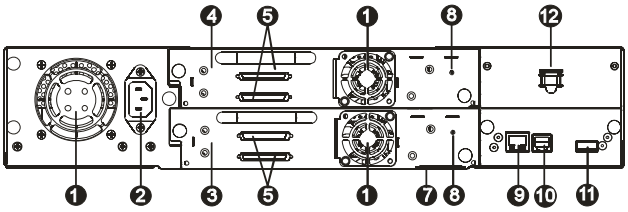


Table 6 *Back panel description*

Number	Description
1	Fan vent
2	Power connector: The library requires a 110/220 volt AC power connection
3	Tape drive tray 1
4	Tape drive tray 2
5	68-pin HD SCSI connectors
6	FC connector
7	Foil Product label
8	Drive LED
9	Ethernet port
10	Serial port
11	USB port (Host)
12	Shipping lock

5.6 Installing the library

Choosing a location

Choose a location that meets the following criteria:

Table 7 *Location criteria*

Criteria	Definition
Rack requirements	Standard 19-inch rack with 2U of clearance
Room temperature	10-35º C (50-95º F)
Power source	AC power voltage: 100-127 VAC; 200-240 VAC Line frequency: 50-60 Hz Place the library near an AC outlet. The AC power cord is the product's main AC disconnect device and must be easily accessible at all times.
Weight without media	Single drive unit: 14.7 kg Two drive unit: 15.6 kg
Weight with media	Single drive unit: 20.2 kg Two drive unit: 21.1 kg
Air quality	The library should be placed in an area with minimal sources of particulate contamination. Avoid areas near frequently used doors and walkways, stacks of supplies that collect dust, printers, and smoke-filled rooms. Excessive dust and debris can damage tapes and tape drive.
Humidity	20-80 percent RH non-condensing
Clearance	Back: Minimum of 15.4 cm (6 inches) Front: Minimum of 30.8 cm (12 inches) – for mailslot Minimum of xx cm to remove magazines Sides: Minimum of 5.08 cm (2 inches)

Unpacking the tape library

Before you begin, clear a work surface to unpack the library. Select an open 2U rack location allowing easy access to the host server and an easily accessible power outlet.

CAUTION: If the temperature in the room where the library will be installed varies by 15º C (30º F) from the room where the library was stored, allow the library to acclimate to the surrounding environment for at least 12 hours before unpacking it from the shipping container.

Unpacking the library:

1. Before opening and removing the library from the shipping container, inspect the container for shipping damage. If you notice any damage, report it to the shipping company immediately.
2. Open the shipping container and remove the two rack rails and set aside.
3. Carefully remove the shipping materials from the top of the library. Remove the accessory package and set aside.
4. Lift the library out of the carton and remove the bag from the library. Remove the foam cushion from the back of the library. Save the packaging materials for future use.

CAUTION: Do not place the library on either end or sides as this may damage the library.

Identifying product components

Confirm that you have received the following:

- Library
- Terminator
- SCSI cable
- Rack mount kit:
    - 2 rack mount rails
    - 1 bag of nine M6 screws for the Rack (9.5 mm square holes in the rack column)
    - 1 bag of nine M6 screws for rack mounting (6.85 mm)
    - 2 mounting brackets
    - 4 M3x6 Torx screws to fix the mounting brackets
    - 1 T10 Torx screwdriver
    - 2 guide pulleys
    - 2 M3x8 Torx screws to fix the guide pulleys
    - 2 M5 screws to secure the mounting brackets to the rack
- Documentation CD
- Quick Start Guide

Removing the shipping lock

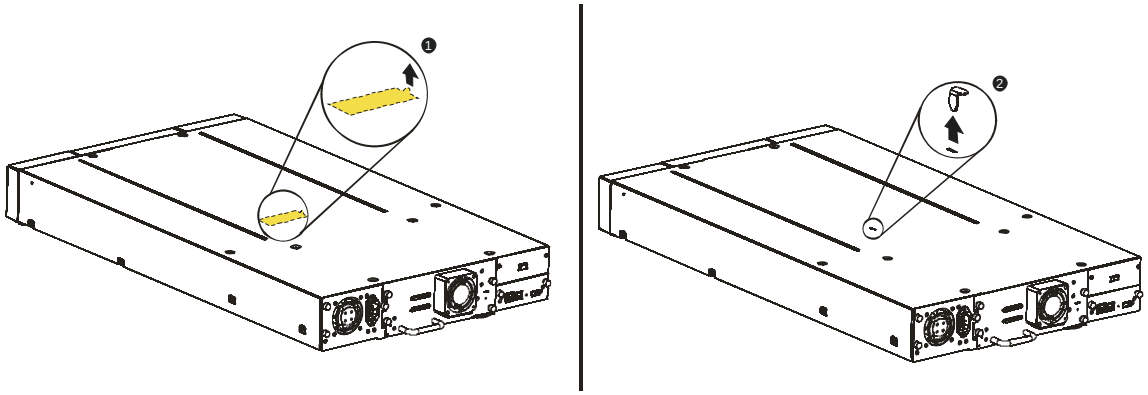
IMPORTANT: The shipping lock, which prevents the robotic transport mechanism from moving during shipment, must now be removed before the library is powered on.

The shipping lock is held in place with a label and is located in the top center of the library. After the shipping lock is removed, it should be stored on the rear panel right side of the library for future use.

To remove and store the shipping lock:

5. Remove the yellow label that is securing the lock to the top of the library, and then remove the lock (see Figure 6).

Figure 6 *Shipping lock and label*



6. Store the lock and label on the rear panel of the library (see Figure 7).

IMPORTANT: If you are required to transport the library, we recommended that the shipping lock and label is replaced on the top cover (see Figure 8).

Figure 7 *Shipping lock and label on the rear panel*

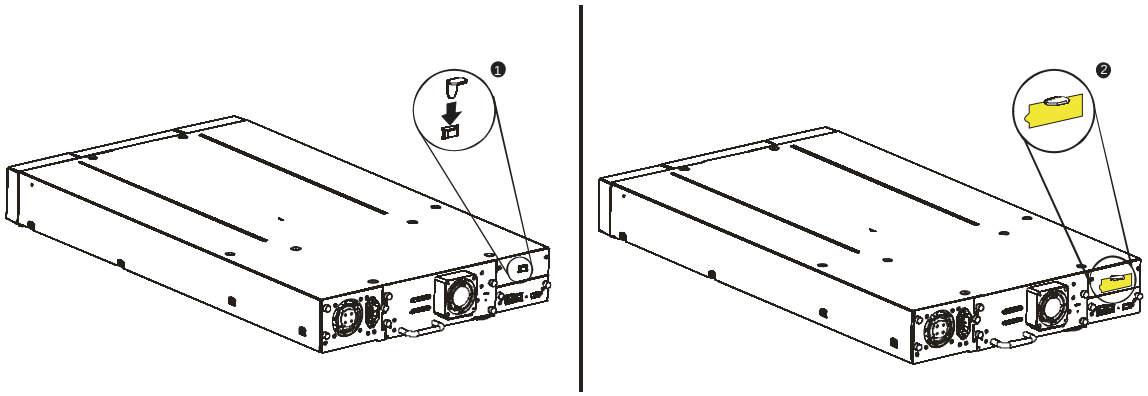
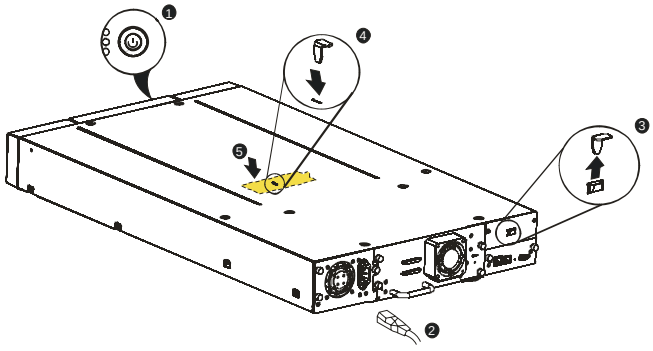


Figure 8 *Shipping lock before transportation*



Rackmounting the library

The library easily installs into a standard 19” rack system taking up 2U of space.

WARNING! The AP Series tape library weighs 15.6 kg without media.

To reduce the risk of personal injury or damage to the library:

1) observe local health and safety requirements and guidelines for manual material handling,
2) obtain adequate assistance to lift and stabilize the library during installation or removal,
3) always remove all tapes to reduce the overall weight of the library.

Required tools:

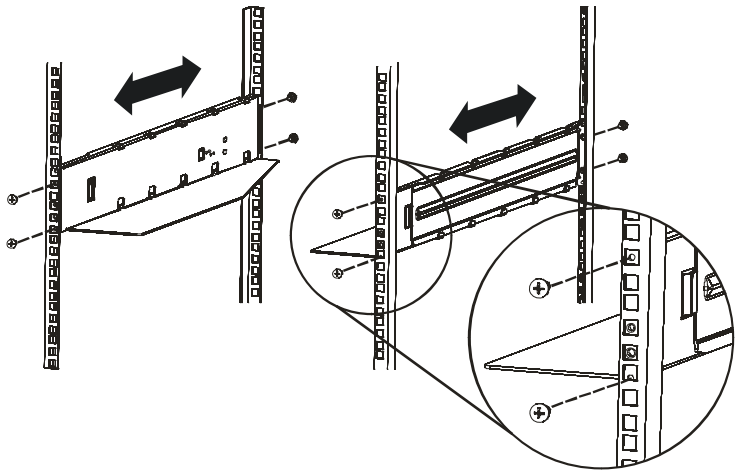
7. #3 Phillips screwdriver
8. T10 Torx screwdriver (included in you shipment)

There are two sets of eight M6 screws in the accessory package that came with your library. The type of rack that you have will determine the type of M6 screw that you will use.

To install the library:

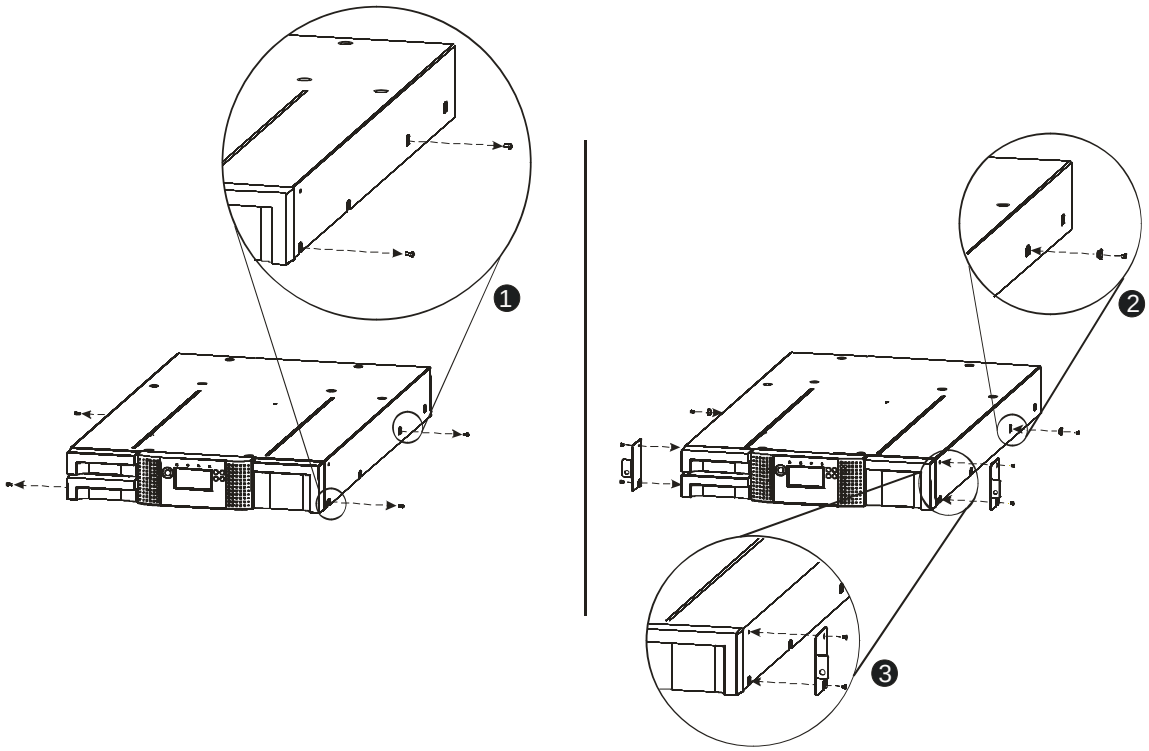
9. Determine the location in you rack for your library to be installed and, using a pencil, mark the location on each vertical rail in you rack.
10. Using the screws for your rack type, and a #3 Phillips screwdriver, secure one rail to each side of the rack in your chosen rack location. Secure both the front and back of each rail to the rack. The rails extend to fit a variety of rack depths. The correct orientation of the left and right rails is shown in Figure 9.

Figure 9 *Installing the rails into the rack*



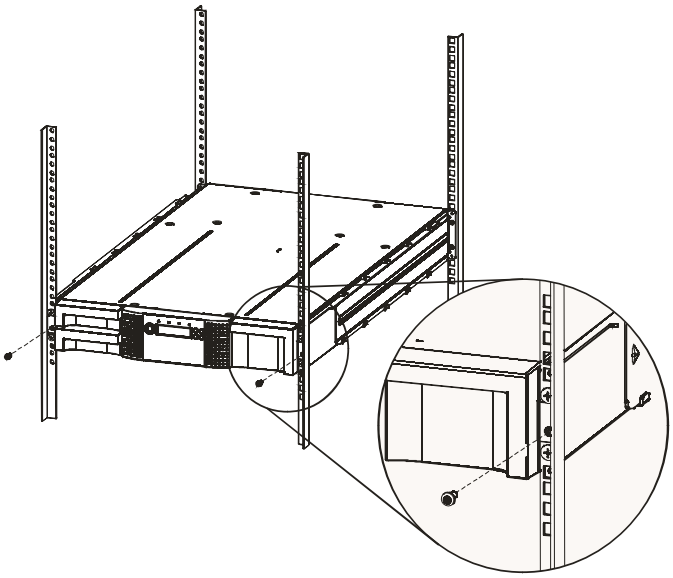
11. Using the Torx screwdriver, remove the screws on each side of your library. Shown in Figure 10 (step 1).

Figure 10 *Installing the mounting brackets and guide pulleys*



12. Install the library guide pulleys on each side of the library using the 2 Torx screws included in the rack kit (see Figure 10 step 2).
13. Install the mounting brackets of the library using the 4 Torxs screws included in the rack kit. Shown in Figure 10 (step 3).
14. With library guide pulleys and mounting brackets installed, slide the library onto the rails.
15. Secure the library to the rack (see Figure 11) using a 3# Phillips screwdriver placed through the small holes in the mounting bracket to tighten the M5 screw on each side of the library.

Figure 11 *Securing the library to the rack*



Connecting the SCSI and power cable

NOTE: The LTO3 tape drive is an Ultra 160 or 320 SCSI LVD device. Only cables and terminators specified for Ultra160 or 320 use or labeled as Multi Mode should be used.

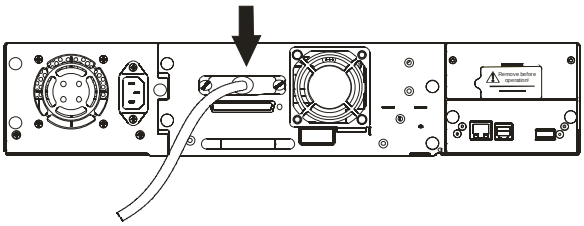
WARNING! Approved power cord for your specific geographic region. Use of a non-manufacturer approved power cord may result in:
1) not meeting individual country specific safety requirements;
2) insufficient conductor amp city that could result in overheating with potential personal injury and/or property damage;
3) an unapproved power cord could fracture resulting in the internal contacts being exposed, which potentially could subject the user to a shock hazard. Manufacturer disclaims all liability in the event a non-manufacturer approved power cord is used.

CAUTION: Failure to remove the power cables from these devices could result in damage to the library.

To connect the SCSI and power cable to the tape library:

16. Shut down and turn off the selected server. Turn off all attached devices, such as printers and other SCSI devices. Remove the power cables from the server and all attached accessories.
17. Attach one end of the SCSI cable (included in the accessory package) to one of the connectors on the back panel of the library (see Figure 12).

Figure 12 *Attaching the SCSI cable to the LTO3 full height drive*

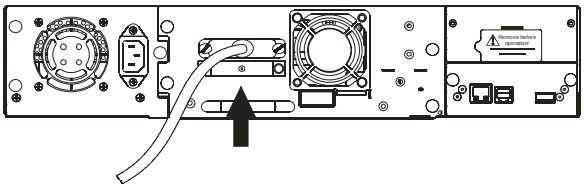


18. Attach the other end of the SCSI cable to the connector on the SCSI host bus adapter or to the connector on the previous device on the SCSI bus.

NOTE: The host bus adapter should be LVDS. A SE SCSI host bus adapter will work, but will severely degrade performance, and limit cable length. If there are any SE devices on the same SCSI bus, the entire SCSI bus will negotiate down to SE speed and severely degrade performance. Never attach the LTO3 tape drive to a SE SCSI bus.

19. Attach the terminator to the remaining SCSI connector on the back panel of the library, if the library is the last or only device on the SCSI bus (see Figure 13). Otherwise, attach one end of a SCSI cable to the remaining port and the other end to the next device on the SCSI bus. Make sure that the last device on the SCSI bus in properly terminated.

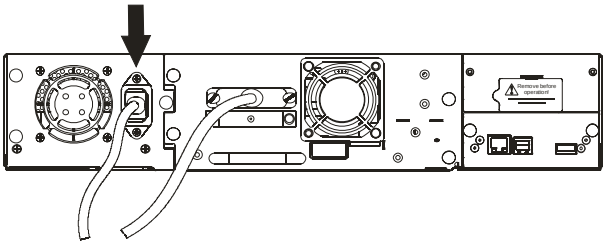
Figure 13 *Attaching the terminator to the LTO3 full height drive*



20. Attach the power cable to the power connector on the back panel of the library (see Figure 14).

21. Plug the power cable into the nearest properly grounded power outlet.

Figure 14 *Attaching the power cable*



CAUTION: To disconnect all power from the library, remove the power cord from the outlet. The power button only puts the power on stand-by.

22. Turn on the library using the power button. Check the LCD screen to make sure the library is receiving power. If it is not, check the power connections and your power source. During the Power-On-Self-Test (POST), all four LEDs are illuminated briefly, followed by a flashing Ready LED. When the initialization sequence is complete, the Home screen will be displayed.

23. Plug in the host server or workstation and all attached devices.

24. Turn on any other devices you turned off earlier.

25. Turn on the server.

6 Operating the tape library

6.1 Operating Modes

There are 2 basic modes that the OCP operates in. First is the User Interaction mode. This mode is employed when a user is pushing buttons on the Op-Panel. The second mode is the System Driven mode. This is the normal mode of operation. In this mode, the Op-Panel displays status associated with the actions that were caused from commands issued via the Drive's serial interface. Actions like Loading, Rewinding or Moving tape will be displayed. When an Op-Panel button is pressed and released, the Op-Panel automatically transitions to User Interaction mode. User Interaction mode will continue until 3 minutes after a user stops pushing buttons, or the requested robotic action stops - whichever is longer. At this time the Op-Panel will return to System driven mode.

In case of activated User security feature the User Interaction Mode is restricted to the Information and Login menu item, until a login with correct PIN is done.

6.2 OCP Philosophy

OCP operation must obey some basic rules. These rules of operation constitute a 'philosophy'.

- Any operational conflict between commands received over SCSI or RMU and those entered via the front panel will be avoided with a reservation mechanism on a 'first-come, first-served' basis. Any reservation by OCP is canceled by an OCP logout or the timeout, which cancels the User Interaction Mode.
- Library firmware will not allow a user to select an impossible request. Those situations will include, but are not limited to:

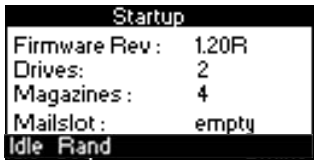
  Moving a cartridge from any source to a full slot
  Moving a cartridge from an empty slot
  Loading a cartridge from any source to a full drive
  Unloading a cartridge from an empty drive

- Any error detected by the library or drive controller and not recoverable through predetermined firmware algorithms will be considered as fatal. An error code will be displayed on the LCD and the error LED will become illuminated. The error code will remain on the OCP until a push button is pressed, which will cause the OCP to return to the Home Screen.
- Numeric error codes are only used for unrecoverable, fatal errors, otherwise text status messages are provided.

6.3 Power-Up Display

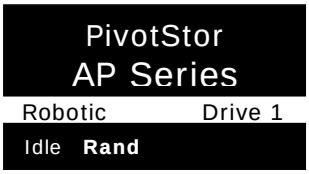
When the Automatic Protection (AP) Series device powers up, or resets, it goes through several internally controlled processes that allows it to get initialized and running. This processes are called Power-On-Self-Test (POST). While the POST is happening, the Op-Panel shall have appropriate information displayed to keep the user informed. When the loader finishes coming alive, it will display the current device status for a defined time or until a key is pressed.

Figure 15 *Start-Up Screen*



After this initial status screen the home screen will be shown until a key is pressed. This home screen shows the overall health of the loader, indicating the status of the robotic and the connected drives.

Figure 16 *Home Screen*



6.4 Note about the LED's

All LEDs are updated during Power Up and Reset sequences. Upon power up or software Reset, the loader will illuminate all LEDs as soon as POST allows. This will help the User to verify if all LEDs are functional. When initialization starts, all LEDs will be extinguished and the Ready/Activity LED will flash at a reasonable rate of approximately 1-second per cycle, 50% duty cycle. When the mechanical initialization is complete, the Ready/Activity LED will stop flashing and be constantly illuminated.

If a loader failure occurs, the Ready/Activity LED will be turned off and the Error LED will be illuminated. The Op Panel will also display an appropriate error code to help identify the failure.

The following are additional operational details of LEDs.

- The "Ready/Activity" LED will be lit any time the unit is powered on and functional (i.e. passed power-on self-test). The Ready/Activity LED will blink whenever there is tape library or drive activity. This LED will also blink when the unit is Offline.
- The "Clean" LED will only be lit when a cleaning REQUIRED has been issued by the drive. The LED will be turned off again after a successful drive cleaning operation.
- The "Media Attention" LED will indicate that there is a piece of media which is bad/marginal, or invalid. The LED will be cleared when all marginal and invalid cartridges have been exported from the tape library.
- The "Error" LED will be lit when there is an unrecoverable (i.e. hard) drive or tape library failure. This will happen at the same time the hard error message is displayed on the screen and the LED will remain lit until the error state is resolved.

6.5 Input Modes

There are several modes to enter values in the different menu items. These values are selectable predefined values, toggle values (e.g. On/Off) and numerical values like network addresses.

Selectable predefined values

After navigating to the menu item the various predefined values can be selected with the NEXT and PREVIOUS button. As soon as the display shows the correct value it may be confirmed by pressing the "ENTER" button.

Toggle values

Toggle values are used to switch between two different states like *On* and *Off*. After navigating to the menu item the display shows the actual state. Pressing the ENTER button will switch to the possible new state. Pressing ENTER a second time will take over this new state.

Numerical values

Numerical values are needed for network addresses, PIN entries, and other configuration entries. After navigating to the menu item to be changed, the actual value will be displayed and the cursor stays on the first digit. The value may be incremented / decremented with the NEXT and PREVIOUS button. After pressing the ENTER button the cursor is set to the next editable digit. It can be changed in the same way. After pressing the ENTER button at the last digit the complete entry will be stored. Pressing the CANCEL button will cancel the whole edit process and the old value is valid again.

6.6 Power ON/OFF

Part of the operator control panel is the Power On/Off button. Pressing this button will initiate a controlled Power Down of the unit (soft landing). The following operations will take place before the unit shuts down completely:

- The display indicates with an appropriate message that the shutdown is in progress
- The library controller finishes all ongoing loader and drive activities
- The robotics is moved to its home position
- The library controller switches off the power supply's secondary side
- To abort the shutdown process the user has to press Cancel within the first 3 seconds

Note: The shutdown process may be aborted by pressing Cancel within the first 3 seconds.

6.7 OCP Menu Flow Charts

Figure 17 *OCP User interaction Mode*

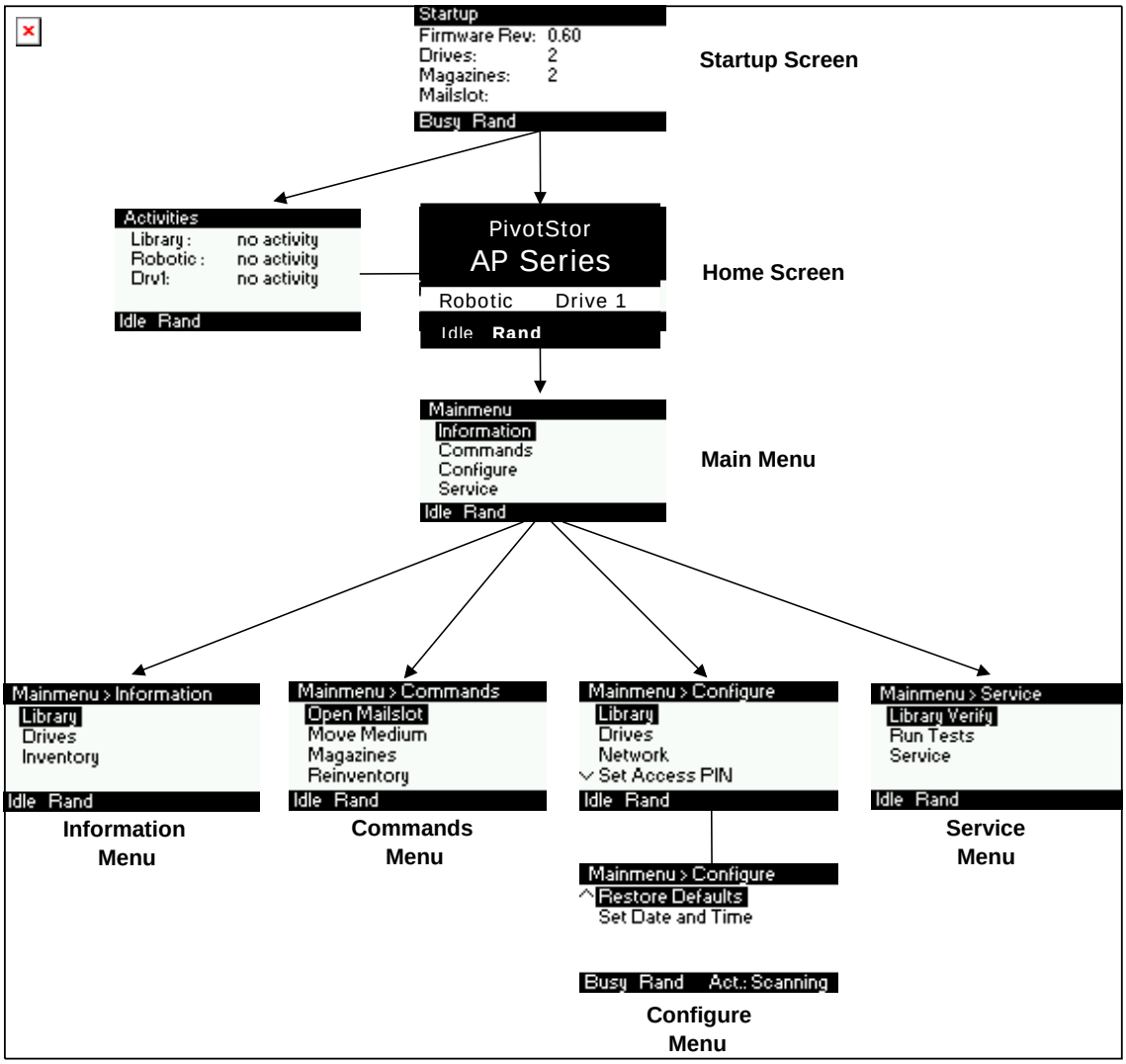


Figure 18 Interaction Mode, Information

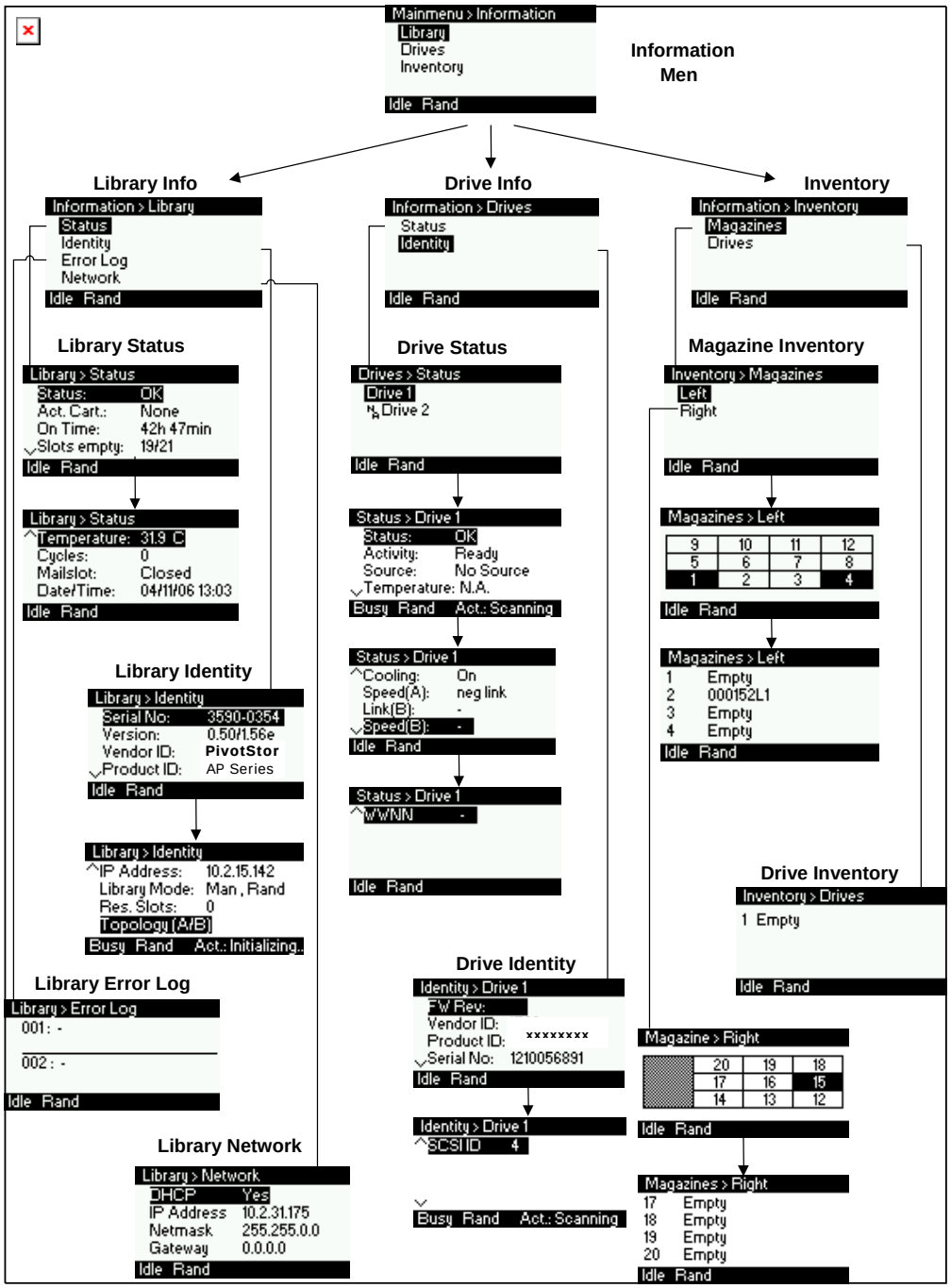


Figure 19 Interaction Mode, Commands

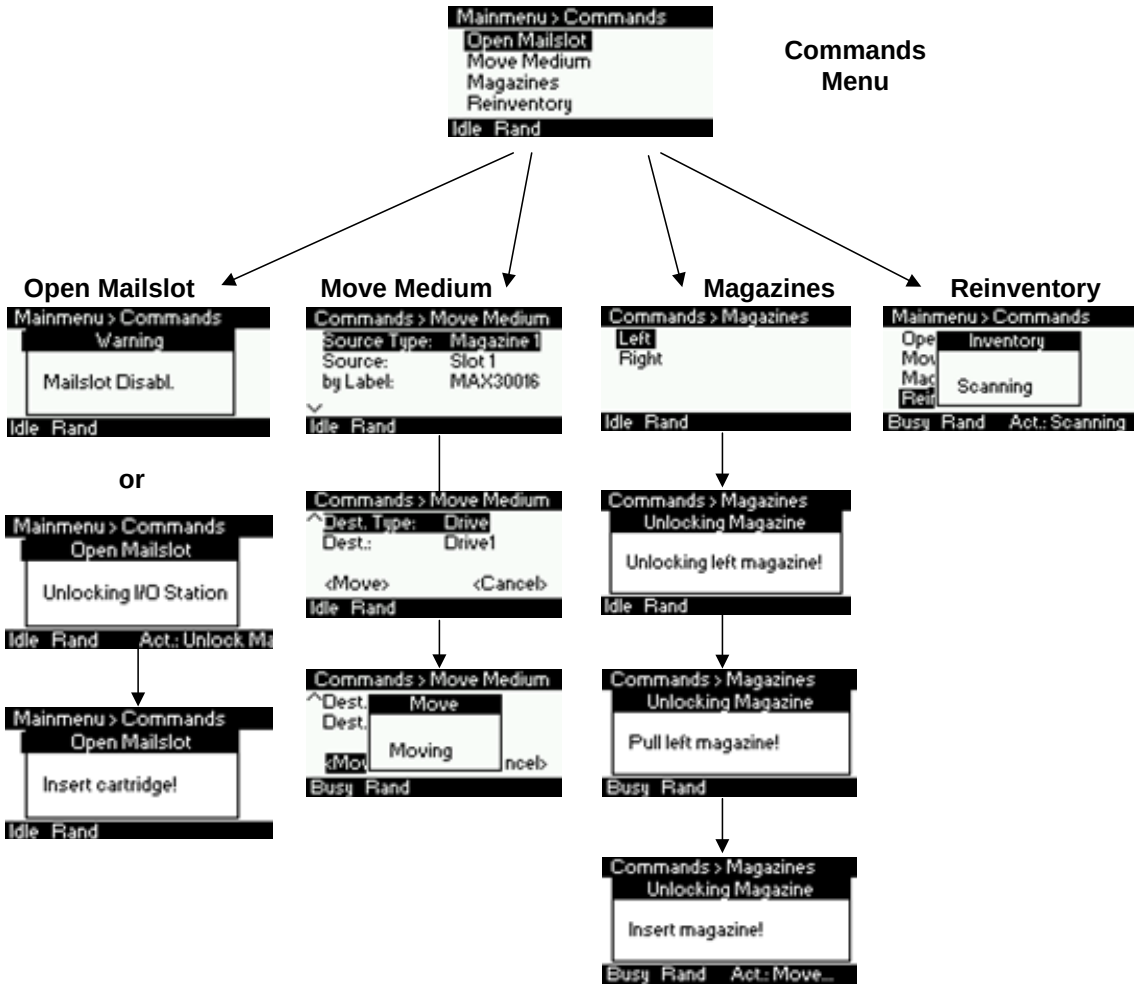


Figure 20 Interaction Mode, Configuration

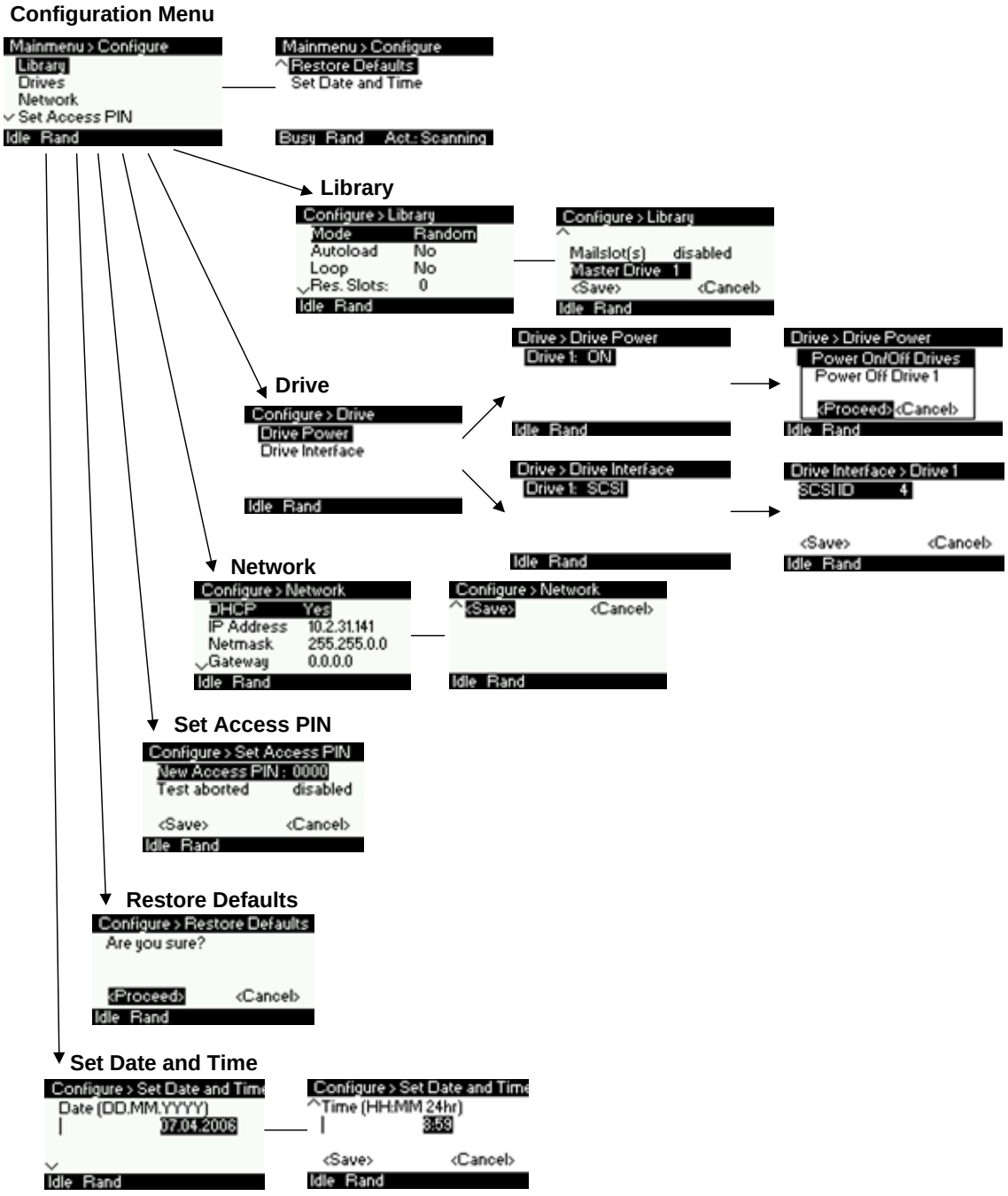
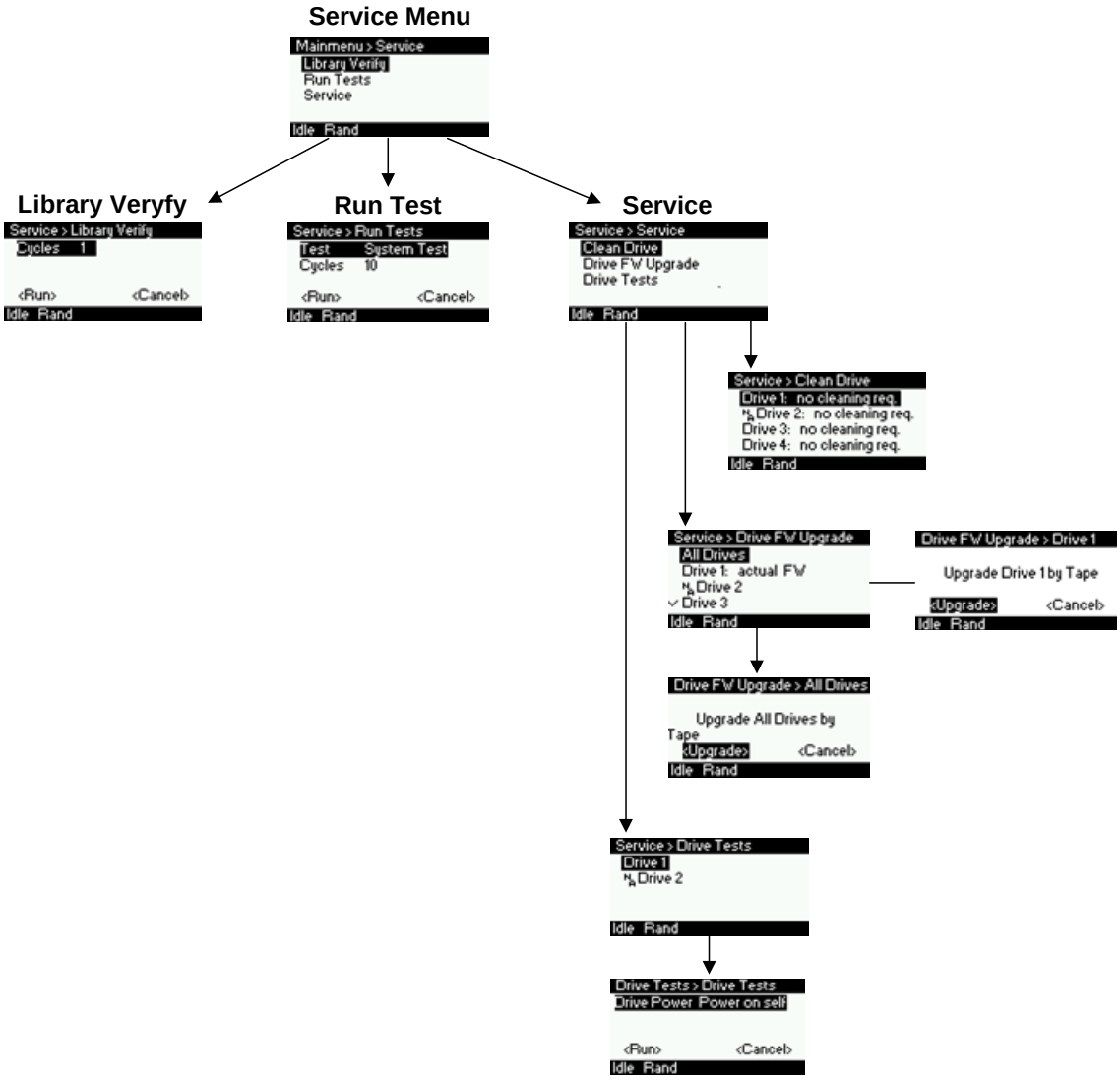


Figure 21 Interaction Mode, Service



6.8 Tape cartridges

Before you begin using the library, an understanding of the media type, use, maintenance, and how to properly label and write-protect your tape cartridges will help you to prolong the life of your tape cartridges as well as the tape library.

AP Series tape library cartridge type

The cartridge types supported depends on the drive types installed. The loader will support any type of data cartridge and cleaning cartridge the drive(s) will support.

NOTE: Some tape drives includes support for both rewriteable and WORM data cartridges. Write-Once, Read-Many (WORM) data cartridges provide an enhanced level of data security against accidental or malicious alteration of data on the tape cartridge. The WORM data cartridge can be appended to maximize the full capacity of the tape cartridge, but the user will be unable to erase or overwrite data on the cartridge.

Using and maintaining tape cartridges

Do not degauss Ultrium LTO data cartridges! These data cartridges are pre-recorded with a magnetic servo signal. This signal is required in order to use the cartridge with Ultrium LTO tape drives. Keep Ultrium LTO cartridges apart from strong magnetic fields.
Before you use the library to ensure the longest possible life for your data cartridges, follow these guidelines:

- Use only the data cartridges that are designated for your model of library
- Clean the tape drive when the **Clean** Drive **LED** is illuminated.
- Be sure to use only Ultrium Universal cleaning cartridges.
- Do not drop a cartridge. Excessive shock can damage the internal contents of the cartridge, or the cartridge case itself, making that cartridge unusable.
- Do not expose your data cartridges to direct sunlight or sources of heat, including portable heaters and heating ducts.
- The operating temperature range for your data cartridges is 10 to 35º C. The storage temperature range is -40 to +60º C in a dust-free environment in which relative humidity is always between 20 percent and 80 percent (non-condensing).
- If the data cartridge has been exposed to temperatures outside the ranges specified above, stabilize the cartridge at room temperature for the same amount of time it was exposed to extreme temperatures or 24 hours, whichever is less.
- Do not place data cartridges near sources of electromagnetic energy or strong magnetic fields such as computer monitors, electric motors, speakers, or X-ray equipment. Exposure to electromagnetic energy or magnetic fields can destroy data and the embedded servo code written on the media by the cartridge manufacturer, which can render the cartridge unusable.
- Place identification labels only in the designated area on the cartridge.

Labeling tape cartridges

Attaching a barcode label to each tape cartridge enables the library and application software to identify the cartridge quickly, thereby speeding up inventory time. Make it a practice to use bar code labels on

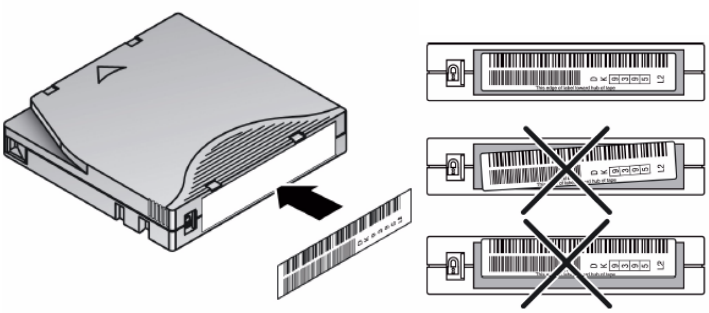
your tape cartridges. Your host software may need to keep track of the following information via the associated barcode:

- Date of format or initialization
- Tape's media pool
- Data residing on the tape
- Age of the backup
- Errors encountered while using the tape (to determine if the tape is faulty).

IMPORTANT: The misuse and misunderstanding of bar code technology can result in backup and restore failures. To ensure that your bar codes meet manufactures quality standards, always purchase them from an approved supplier and never print bar code labels your self.

Ultrium tape cartridges have a recessed area located on the front of the cartridge next to the write-protect switch. Use this area for attaching the adhesive-backed bar code label. Only apply labels as designated in Figure 22.

Figure 22 *Ultrium tape cartridge and proper bar code label placement*



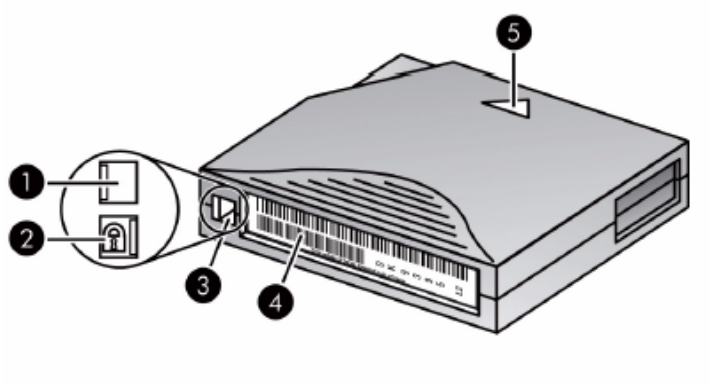
IMPORTANT: The bar code label should only be applied as shown in Figure 23 with the alphanumeric portion facing the hub side of the tape cartridge. Never apply multiple labels onto a cartridge, as extra labels can cause the cartridge to jam in a tape drive.

Write-protecting tape cartridges

All rewritable data cartridges have a write-protect switch to prevent accidental erasure or overwriting of data. Before loading a cartridge into the library, make sure the write-protect switch on the front of the
cartridge is in the desired position.

- Slide the switch to the right to write-protect the cartridge. A small pad-lock is visible indicating that the cartridge is write-protected (see Figure 23).
- Slide the switch to the left to allow the library to write data to the cartridge (see Figure 23).

Figure 23 *Write-protecting the Ultrium data cartridge*

	Number	Description
	1	Write-enabled
	2	Write-protected
	3	Write-protect switch
	4	Barcode label
	5	Insertion arrow

Backward read compatibility

See compatibility guide of tape drives used.

Barcode reader

The barcode reader provides inventory feedback to the host application and/or LCD screen by reading the cartridge barcode labels. The library stores the customized inventory data in memory.

Magazines

Cartridges are stored in magazines. Up to 12 cartridges can be stored in each magazine. Magazines may be removed and inserted individually.

The Automatic Protection (AP) Series tape library has two removable magazines in the 2U library (see Figure 24 and Figure 25). Magazine access can be password protected. For safety reasons, the robotic motion is stopped when a magazine is removed.
The magazines can be released using the Operator Control Panel (OCP) or the Remote Management Unit (RMU) In case the OCP or RMU initiated process has failed or the library no longer has power a manual emergency release is available.

IMPORTANT: To manually release a magazine, see „Magazine emergency release" on page 65. However, this manual process should only be used if the magazine cannot be released using the Operator Control Panel or the Remote Management Unit.

Figure 24 *Left magazine*

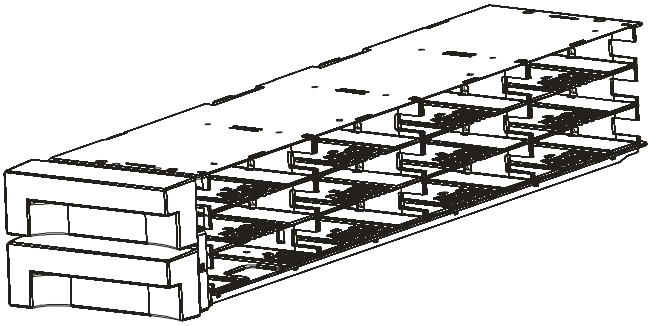
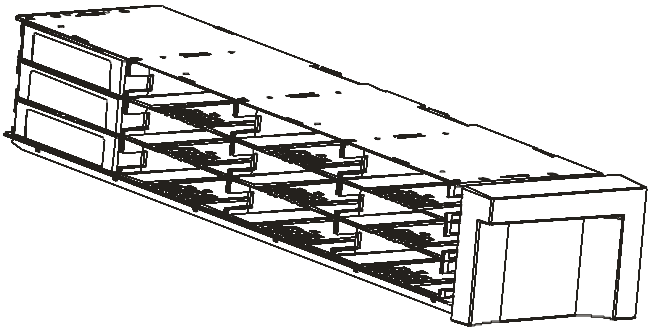


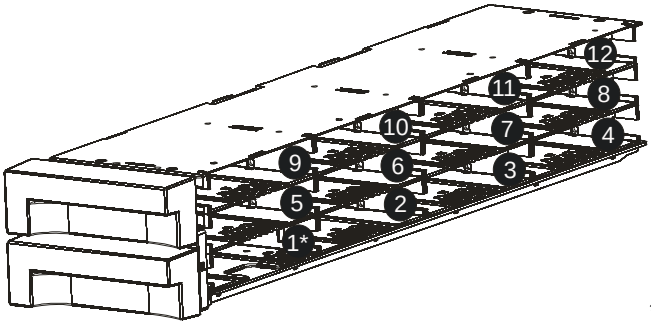
Figure 25 *Right magazine*



Inserting tape cartridges into a magazine

The slot numbering scheme is shown in Figure 26 for the left magazine, and Figure 28 for the right magazine.

Figure 26 *Slot numbering left magazine*



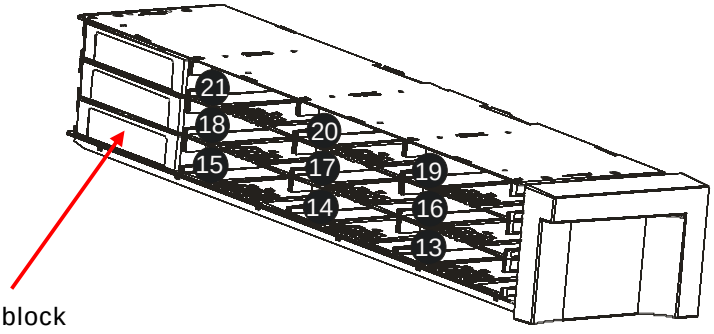
* Mailslot

Mailslot

Mailslots are used to import/export individual cartridges without interrupting library operation. The command to open the mailslot may be denied if the robotics is busy with some operation. In that case *„Busy“* is displayed and the command has to be repeated once the robotics operation is finished.(See Figure 27)

Figure 27 *Handling mailslot*

Figure 28 *Slot numbering right magazine*



Slot’s to block

7 Remote management unit (RMU)

7.1 Overview

Many of the same operations performed from the operator control panel can also be performed remotely using the Remote Management Unit.

The RMU lets you monitor and control your library from any terminal connected to your network or through the World Wide Web (WWW). The RMU hosts a dedicated, protected Internet site that displays a graphical representation of your library.

After establishing a connection to the library, open any HTML browser and enter the IP address of the library. To configure the RMU, you must first set the IP address at OCP or DHCP.

7.2 Operations available through the RMU

The following operations are available through the remote management unit:

- Identity, page 40
  - Viewing static library information, page 40
  - Viewing static drive information, page 40
- Status, page 41
  - Viewing dynamic library information, page 41
  - Viewing dynamic drive information, page 41
  - Viewing the tape cartridge inventory, page 42
- Configuration, page 42
  - Changing the system configuration, page 42
  - Changing the drive configuration, page 43
  - Changing the network configuration, page 43
  - Changing the administrative password, page 44
  - Setting date/time, page 45
  - Setting error log mode, page 45
  - Setting event notification parameters, page 45
  - Restoring factory defaults, page 46
- Operations, page 46
  - Moving media within the library, page 46
  - Determining current media inventory, page 47
  - Releasing and replacing magazines, page 47
- Service, page 48
  - Performing general library diagnostics, page 48
  - Determining and updating firmware, page 48
  - Rebooting the library, page 49
  - Viewing library logs, page 49
  - Cleaning tape drive(s), page 50

7.3 Library status icons

Status icons indicate the following conditions.

Table 8 *Status icons*

	The green Status Ok icon indicates that the library is fully operational and that no user intervention is required.
	The yellow exclamation point for Status Warning indicates that user intervention is necessary, but that the library is still capable of performing operations.
	The red X Status Error indicates that user intervention is required and that the library is not capable of performing operations.

7.4 Login

CAUTION: Some options of the RMU take the library offline. This inactive mode can interfere with host-based application software, causing data loss. Make sure the library is idle before attempting to perform any remote operations that will take the library offline.

To login, select the access type and enter the correct password. There are three levels of access:

- Standard user level
- Admin user level
- Service personnel user level. Access to this level is by Service personnel only.

Each level affects which areas you have access to and what actions you can initiate from those areas.

Figure 29 *RMU login page*

7.5 Identity

Viewing static library information

This page provides access to the static information about the system.
The following information can be found, although no changes can be made from this page:

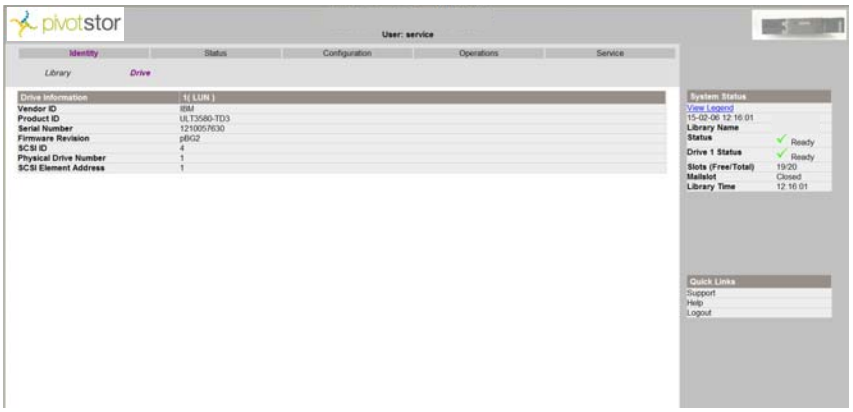
- Serial Number
- Product ID
- Currently Installed Library Firmware
- Bootcode Firmware Revision
- IP Address
- Library Mode

Figure 30 *Identity: library page*

Viewing static drive information

This page provides detailed information about the drive(s). No changes can be made from this page. If a second drive is installed in the library, Drive 2 information will be shown by selecting **Drive 2** from the pull down menu.

Figure 31 *Identity: drive page*



7.6 Status

Viewing dynamic library information

This page displays the dynamic information about the library, such as the current status of the components. The following information can be found on this page:

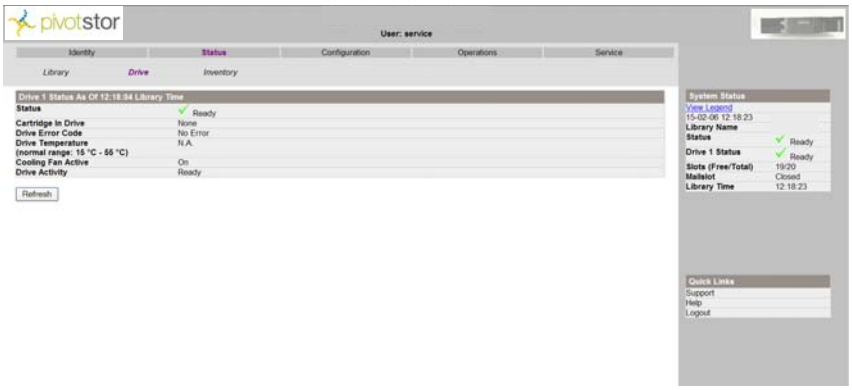
- Status
- Cartridge in Operation
- Odometer
- Total Power On Time
- Robotic Status
- Magazine Left
- Magazine Right
- Mailslot

Figure 32 *Status: library page*

Viewing dynamic drive information

This page provides detailed information about all drives that are present in the library.

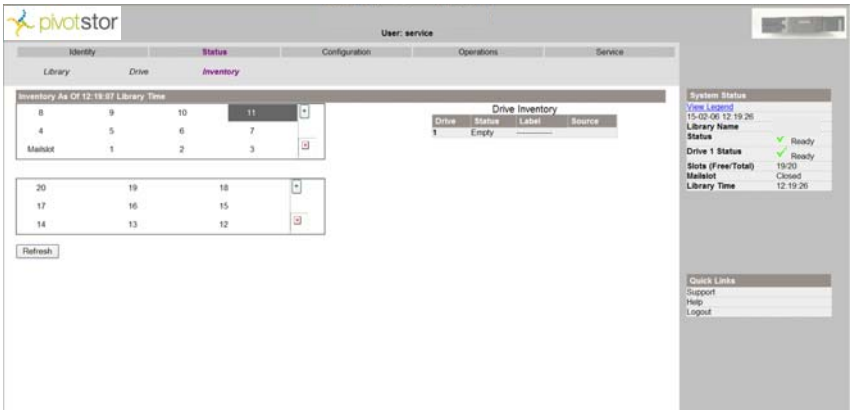
Figure 33 *Status: Drive page*



Viewing the tape cartridge inventory

This page provides detailed information about the tape inventory in the library. A summary of each magazine is shown. To get detailed information, click on the **+** button. This will expand the display for the specified magazine.

Figure 34 *Status: Inventory page*



7.7 Configuration

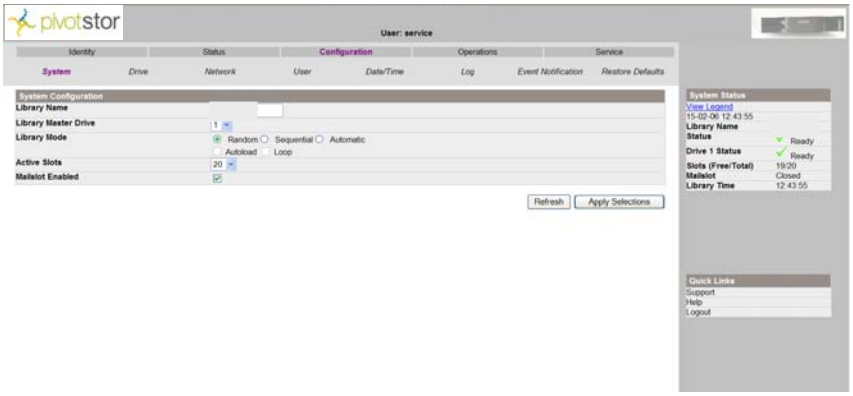
Changing the system configuration

As changes are made, they will only be applied after the **"Apply Selections"** or the **"Submit"** button is selected. After making the selection, a warning page will inform the user of the impact of their
proposed change. In some cases a pop-up screen will ask the operator to confirm their change. Many changes will also require a reboot.

Changes that can be made are:

- Library Name
- Library LUN Hosted by Drive
- Library Mode: Random, Sequential, Automatic Autoload, Loop
- Active Slots
- Mailslot Enabled

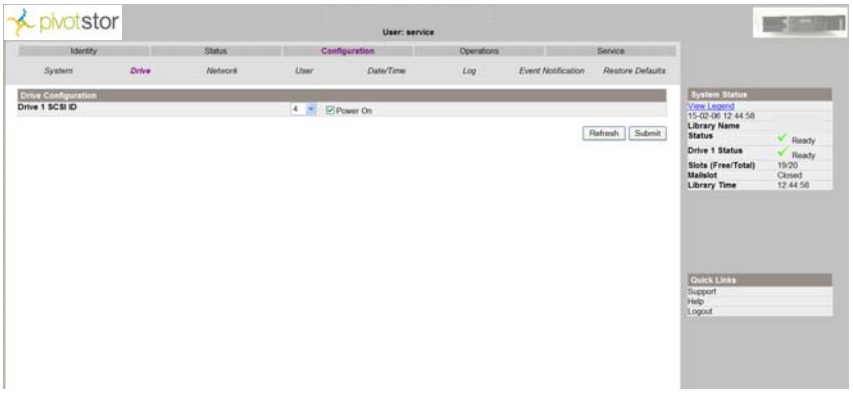
Figure 35 *Configuration: System page*



Changing the drive configuration

This page shows the current configuration of all drives in the library and allows modification to the configuration. The user is also able to select **Power on** through this page white activates the drive.

Figure 36 *Configuration: Drive page*



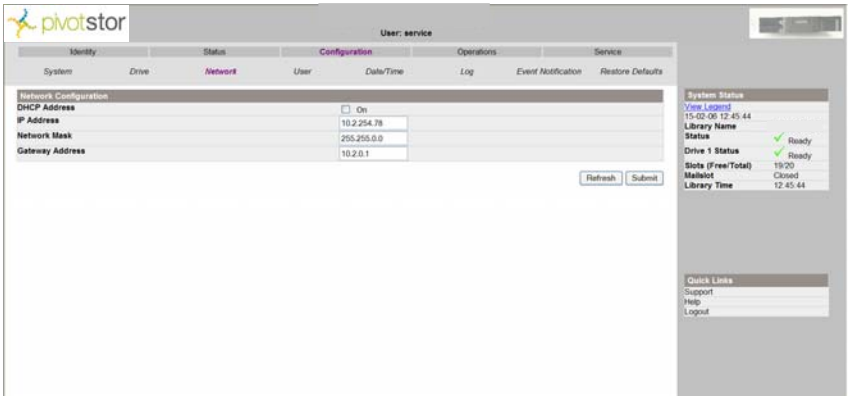
Changing the network configuration

This page shows the current network configuration of the library and allows modification to the configuration. When a change is requested, a pop-up box will ask to confirm the changes.

A list of changes that can be made are:

- DHCP Address - checked On or unchecked Off (when on static address not used)
- IP Address
- Network Mask
- Gateway Address

Figure 37 *Configuration: Network page*

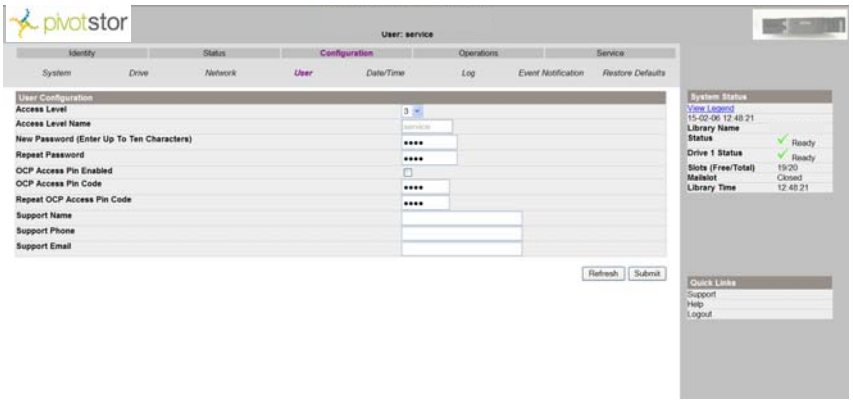


Changing the user names and password

This page allows the user to add and modify user accounts.

- Access Level - Choose from 1 (Standard), 2 (Admin), or 3 (Service).
- Access Level Name – the name associated with the chosen Access Level
- New Password – The password can be a maximum of ten characters.
- Repeat Password – Enter the new password again.
- OCP Access PIN Enabled – Select this item, if you would like the Operator Control Panel display to be password protected.
- OCP Access PIN Code – the password for accessing the OCP when the OCP Access PIN is enabled.
- Repeat OCP Access PIN Code – Enter the OCP Access PIN Code again.
- Support Name – the name of the individual within your company to contact for RMU or library support
- Support Phone – the phone number of the individual within your company to contact for RMU or library support
- Support Email – the email address of the individual within your company to contact for RMU or library support

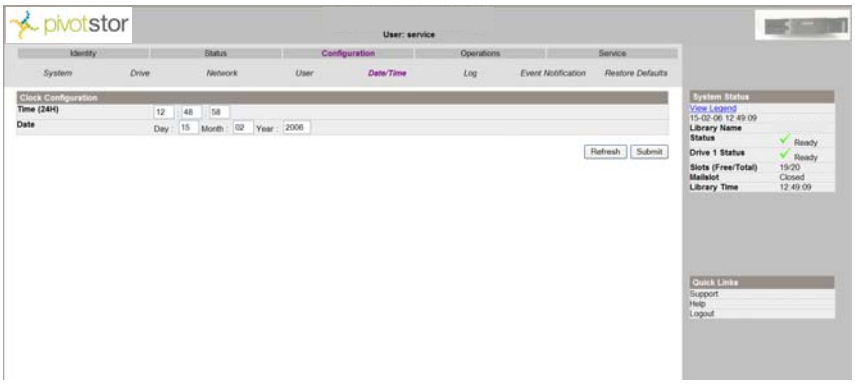
Figure 38 *Configuration: User page*



Setting date/time

This page allows the user to set the time and date, and how it will be displayed.

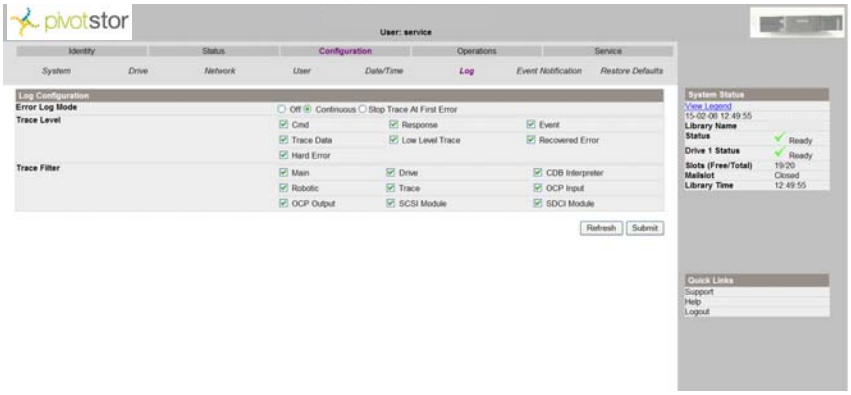
Figure 39 *Configuration: Date/Time page*



Setting error log mode

This page allows the user to set the error log mode to **Off**, **Continuous**, or to **Stop trace at first error**.

Figure 40 *Configuration: Log page*



NOTE: The trace level and trace filter selection options are only changeable by Service personnel.

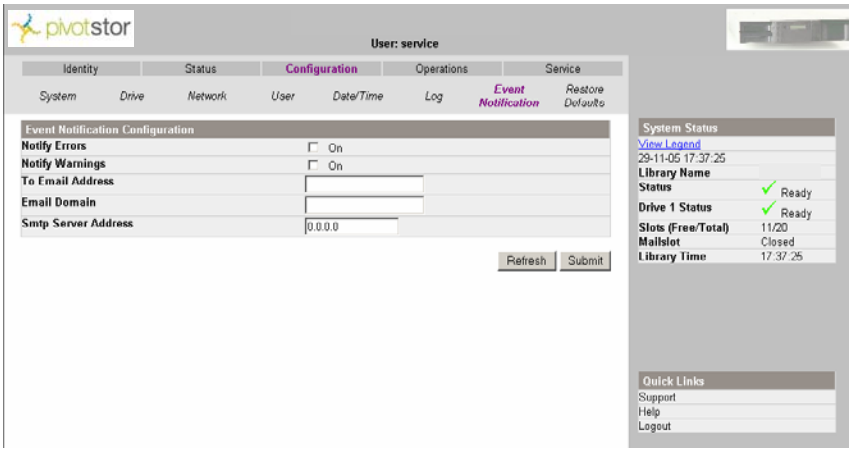
Setting event notification parameters

This page allows the user to set event notification to **On**.
Choices for event notification are:

- Notify Errors – Select this item to be notified of library errors via email

- Notify Warnings – Select this item to be warnings of library errors via email
- To E-mail Address – Enter the email address of the individual you would like to receive the errors and/or warnings
- E-mail Domain – Enter the email domain name of the individual you would like to receive the errors and/or warnings
- SMTP Server Address - Enter the address of thee mail server of the individual you would like to receive the errors and/or warnings

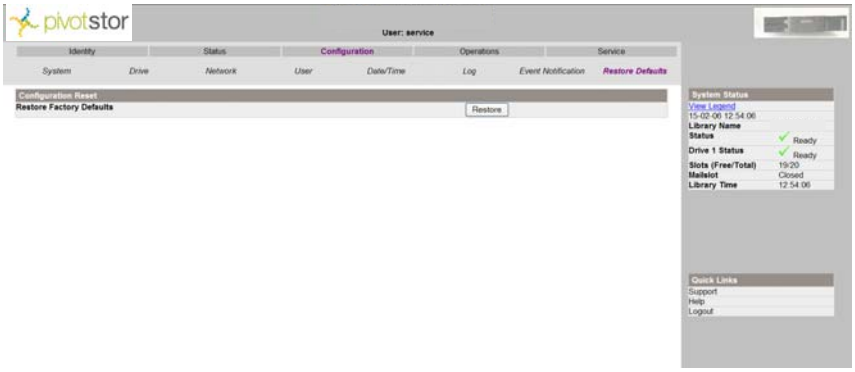
Figure 41 *Configuration: Event notification page*



Restoring factory defaults

This page allows the user to reset the configuration to the factory defaults, restore vital product data, and save vital product data.

Figure 42 *Configuration: Restore defaults page*

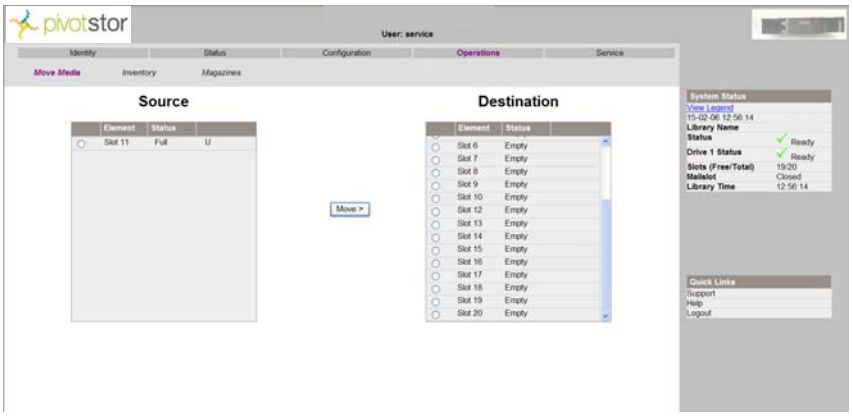


7.8 Operations

Moving media within the library

This page allows the user to move tape cartridges within the library. The source and destination are selected and then the move button in the center of the screen is clicked to activate the move.

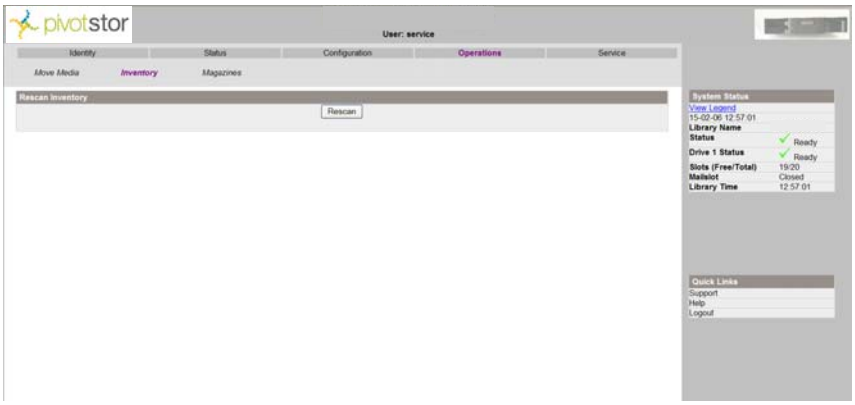
Figure 43 *Operations: Move Media page*



Determining current media inventory

This page provides the user with a means to re-scan the library to determine the current media inventory.

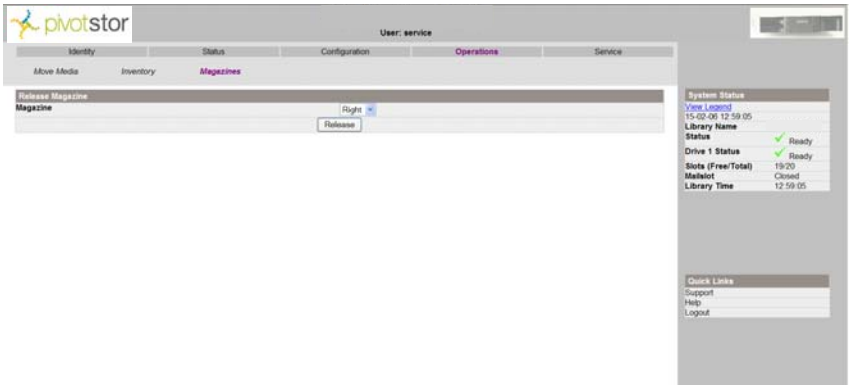
Figure 44 *Operations: Inventory page*



Releasing and replacing magazines

This page allows the user to release the right or left magazine from the library.

Figure 45 *Operations: Magazines page*



NOTE: To manually release a magazine, see ”Removing and replacing a magazine” on page 63.

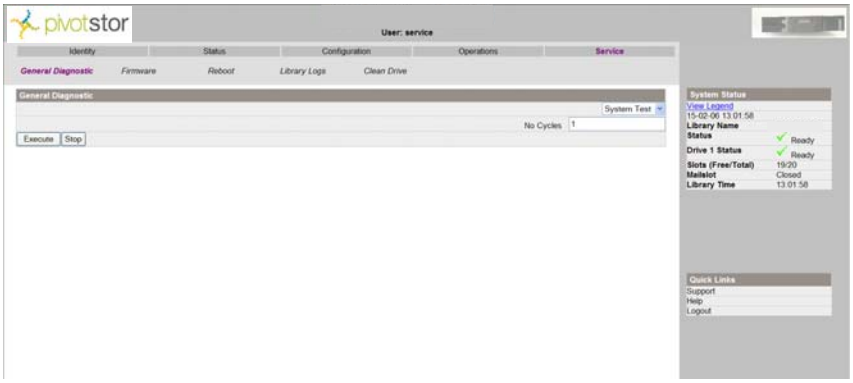
However, this manual process should only be used if the magazine cannot be released using the Operator Control Panel or the Remote Management Unit.

7.9 Service

Performing general library diagnostics

This page provides the system administrator with general tests to verify the usability and reliability of the library. The user selects the number of test cycles before starting the test. To cancel the test before it completes the cycles, select the **Stop** button.

Figure 46 *Service: General Diagnostic page*

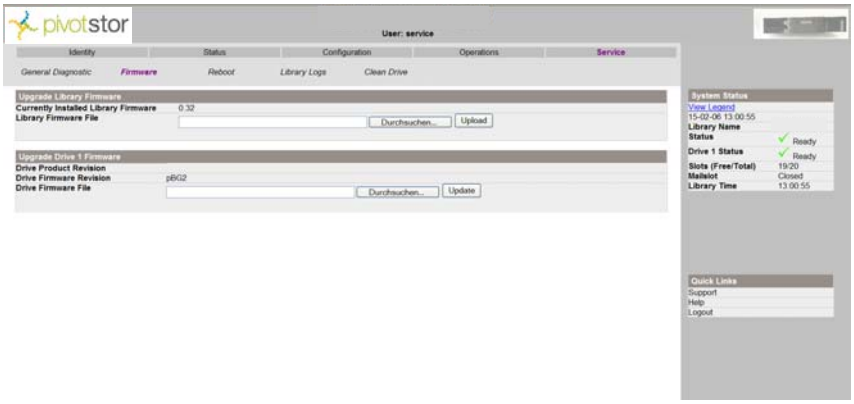


Determining and updating firmware

This page displays the current library and all drive firmware versions. Firmware can be downloaded to the host then uploaded to the drive in the library by using this page.

CAUTION: After a library upgrade the system restarts automatic.

Figure 47 *Service: Firmware page*

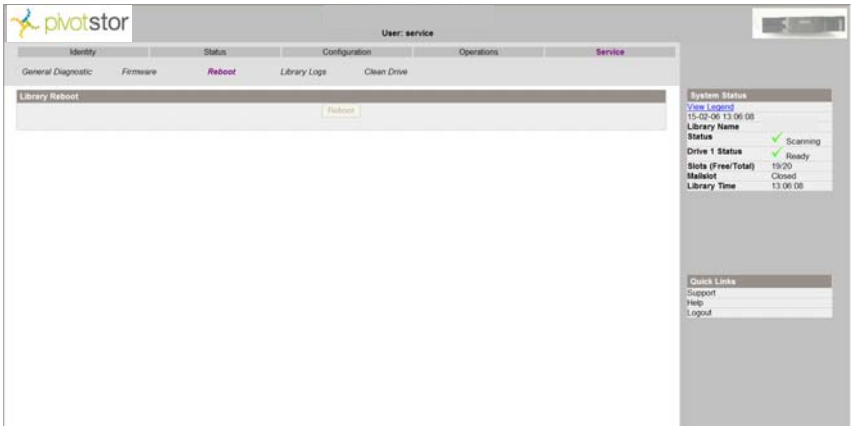


Rebooting the library

CAUTION: Some options of the RMU take the library offline. This inactive mode can interfere with host-based application software, causing data loss. Ensure that the library is idle before attempting to perform any remote operations that will take the library offline.

This page is used to perform a library reboot. There is a default time delay when the Web page refreshes itself. This time should be sufficient to reload the page. However, during a reboot, the connection to the library may be lost. If the connection is lost, the user will have to reload the page manually.

Figure 48 *Service: Reboot page*

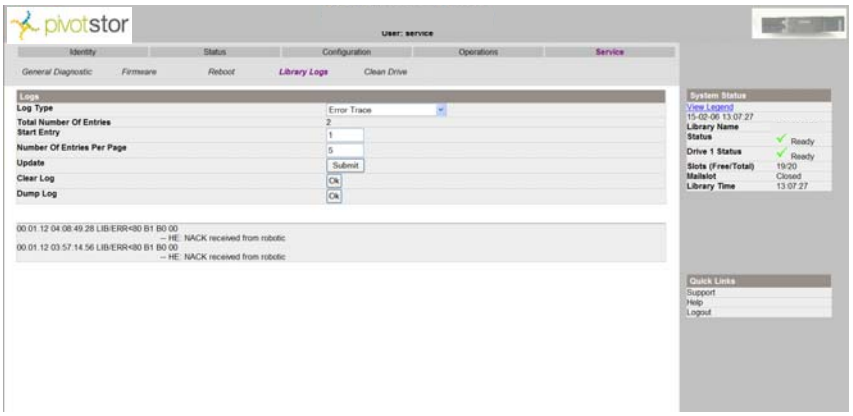


Viewing library logs

This page allows the user to view the library logs after entering the fallowing:

- Log Type
- Total Number of Entries
- Start Entry
- Number of Entries per Page
- Update
- Clear Log
- Dump Log

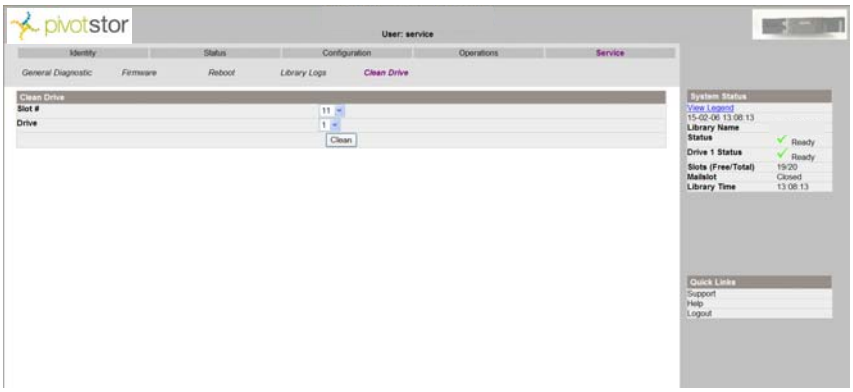
Figure 49 *Service: Library Logs page*



Cleaning tape drive(s)

This page allows the user to clean the tape drive(s).

Figure 50 *Service: Clean drive page*



8 Servicing the tape library

8.1 Possible tools needed

To service a library you may need one or more of the following tools:

26. Flat-blade screwdrivers (large and small)
27. #3 Phillips screwdriver
28. Cross-slot screwdriver
29. Ground strap

8.2 Electrostatic Discharge

CAUTION: A discharge of static electricity can damage static-sensitive devices or micro circuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage.

To prevent electrostatic damage, observe the following precautions:

1. Transport products in static-safe containers such as conductive tubes, bags, or boxes.
2. Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
3. Cover the library with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
4. Keep the work area free of no conducting materials, such as ordinary plastic assembly aids and foam packing.
5. Make sure you are always properly grounded when touching a static-sensitive component or assembly.
6. Avoid touching pins, leads, or circuitry.
7. Use conductive field service tools.

8.3 Removing and replacing a tape drive

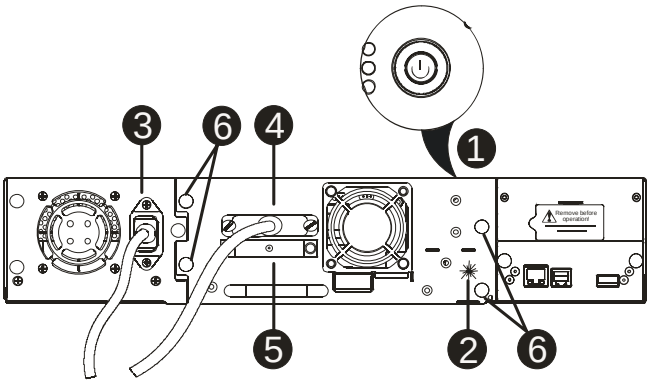
Tape drives are installed at the back of the library.
When replacing one drive in a two drive configuration, you can power down the drive that you are replacing without interrupting power to the rest of the library and the second drive. Refer to “Changing the drive configuration” on page 43.

NOTE: This part is hot pluggable. It is not mandatory to power down the library to replace a drive.

To remove a tape drive:

1. Using your Remote Management Unit or the Operator Control Panel, unload the tape cartridge(s) from the drive to be removed.

Figure 51 *Drive sled components of rear panel*

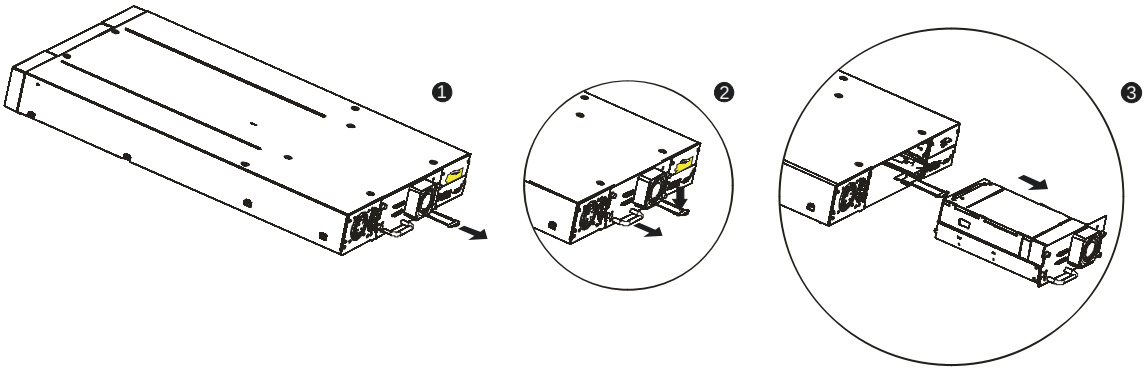


2. Power down the library using the power button on the front panel (see Figure 51 detail 1).
3. The LED on the tape drive being removed is off (Figure 51 detail 2).
4. Remove the power cable, SCSI cable and terminator, if applicable from the tape drive being removed (see Figure 52 details 3, 4 and 5).
5. Loosen the captive thumbscrews on the drive (Figure 51 detail 6).

IMPORTANT: Before pulling the lower drive sled please pull forward the product ID slide located below the drive sled (see figure 52 detail 1). Otherwise the slide or the attached label could be damaged.

6. Pull straight back on the tape drive handle to remove it from the library. Take care to slightly push down the product ID slide so it does not interfere with the drive sled (see figure 52)

Figure 52 *Tape drive removal*

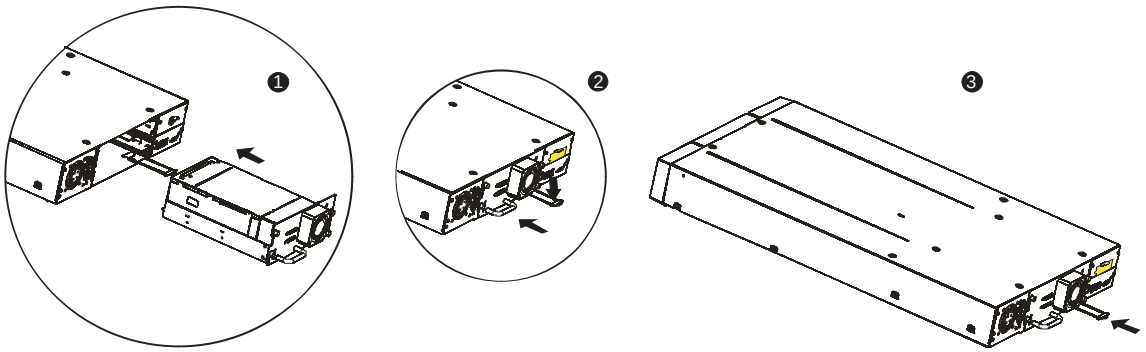


CAUTION: Push in on the tape drive handle while supporting the bottom of the tape drive until it is properly seated. Damage to the connector pins may occur if this procedure is not followed.

To replace a tape drive:

1. Before installing the new drive, inspect the connectors on the tape drive. Ensure that the connectors are intact, free of any foreign objects, and have no cracks or deformed or bent contacts.
2. Slowly insert the new tape drive into the drive bay, and align the connectors on the library while supporting the drive assembly (see Figure 53).

Figure 53 *Installing a tape drive*



3. Push the tape drive slowly into the drive bay until the drive seats itself against the back of the library.

NOTE: If you are adding an additional tape drive to your library, or if you are upgrading an existing drive, be sure to use supported cabling configurations.

4. Push the Product ID Foil back underneath the drive sled. When inserted properly, only the handle of the Foil will be visible.
5. Tighten the captive thumbscrews until the drive is secure.
6. Connecting the power cable, SCSI cable and terminator.
7. Power on the library(or power on the drive refer to “Changing the drive configuration” on page 43) using the power button on the front panel.
8. Run the Library Verify test.

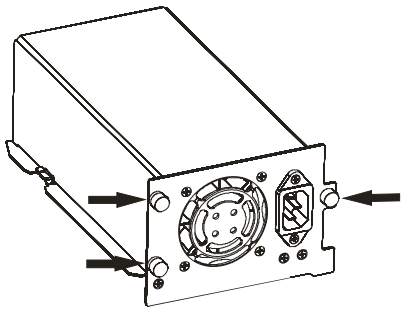
8.4 Removing and replacing a power supply

To remove a power supply:

Power supply is installed at the back of the library. Before you remove the power supply:

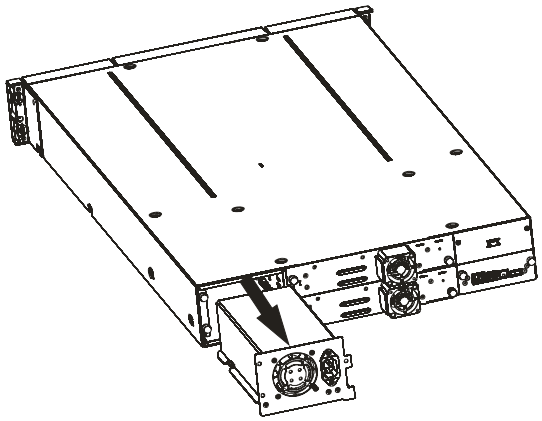
1. Turn off power to the library (power button on the front panel).
2. Remove the power cord cable.
3. Loosen the three captive thumbscrews on the power supply (see Figure 54).

Figure 54 *Position of the three thumbscrews*



4. Pull straight back on the power supply to remove it from the library (see Figure 55).

Figure 55 *Power supply removal*



Replacing the power supply

1. Unpack the new power supply from its package.
2. Slowly insert the new power supply into the bay, and align the connectors on the library while supporting the power supply assembly.
3. Tighten the captive thumbscrews until the power supply is secure.
4. Replace the power cord cable.
5. Switch on power to the library (power button on the front panel).

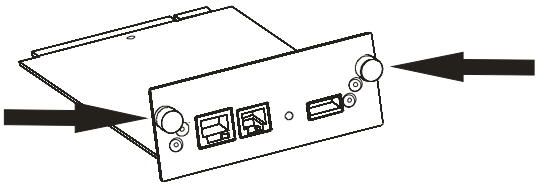
8.5 Removing and replacing the library controller

To remove a library controller:

Library controller is installed at the back of the library. Before you remove the library controller:

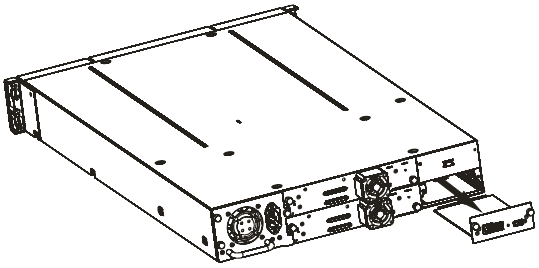
1. Turn off power to the library (power button on the front panel).
2. Remove the power cord cable.
3. Loosen the two captive thumbscrews on the library controller (see Figure 56).

Figure 56 *Position of the two thumbscrews*



4. Pull straight back on the library controller to remove it from the library (see Figure 57).

Figure 57 *Library controller removal*



Replacing the library controller:

1. Unpack the new library controller from its package.
2. Slowly insert the new library controller into the bay, and align the connectors on the library while supporting the controller assembly.
3. Tighten the captive thumbscrews until the library controller is secure.
4. Replace the power cord cable.
5. Switch on power to the library (power button on the front panel).

The library controller maintains a backup of all Critical and Configuration Data separate from the library controller, so that when replacing the library controller, the Critical and Configuration data can be maintained and will not have to be entered manually again. When replacing a library controller, or a chassis FRU, there will be a mismatch between the data on the library controller and the backup data. When such a mismatch is detected, the user will be requested to determine which set of data is correct. If the library controller has been replaced, then select “Identity data mismatch” to copy the backup data onto the library controller. If the chassis FRU or Robotics FRU has been replaced (maintaining the original library controller), then select “Replace backup data”

8.6 Removing and replacing the base chassis

WARNING! The AP Series tape library weighs 17.6 kg without media, and 21.1 kg when both magazines are full (24 cartridges).
To reduce the risk of personal injury or damage to equipment:
1) Observe local health and safety requirements and guidelines for manual material handling,
2) Obtain adequate assistance to lift and stabilize libraries during installation or removal,
3) Remove all tapes to reduce the overall weight of the library.

You will need a #3 Phillips screwdriver to remove and replace the base chassis assembly. Before beginning, be sure the tape drive or drives do not contain a tape cartridge. To remove a cartridge, see "Moving tapes in the library" on page 46.

To remove the components in the base chassis and the base chassis from the rack:

1. Obtain adequate assistance to lift and stabilize the library during removal and replacement.
2. Remove the magazines from the library, see "Removing and replacing a magazine" on page 63.
3. Turn off power to the library and disconnect the power and SCSI cables.
4. Remove the library from the rack:
   - From the front of the library loosen the two screws anchoring the mounting brackets on the library to the rack. These are captive screws and cannot be removed.
   - Remove your library from the rack using assistance..
5. Remove the replacement library enclosure from the packing materials.
6. Place the replacement library enclosure on a solid surface in preparation for installation in to the rack.
7. Remove the mounting brackets and guide pulleys from your library and install them on the replacement library.
8. Loosen the blue thumbscrews on the power supply, and pull the power supply from your library.
9. Install the power supply in your replacement library.
10. Loosen the blue thumbscrews on the tape drive, and pull the tape drive handle while supporting the bottom of the drive to remove from your library.
11. Install your drive in the replacement library enclosure.
12. Loosen the blue thumb screws on the tape drive, and pull the tape drive handle while supporting the bottom of the drive to remove the drive from the library.
13. Repeat Step 12 if you have a second drive.
14. Loosen the blue thumbscrews on the library controller and remove the controller form the library.
15. Install the library controller in your replacement library.
16. Remove the yellow label that is securing the lock on the rear panel, and then remove the lock.
17. Store the lock and label to the top cover (see Figure 8).
18. Repeat Steps 16 and 17 with your replacement library.

19. With assistance, slide the replacement library enclosure onto the metal rails that are already in position in the rack.
20. Tighten the mounting bracket screws to anchor the replacement library enclosure to the rack.
21. Plug in the power cord and host interface cable into the replacement library enclosure.
22. Power on the library.
23. Run the Library Verify test (refer to OCP “Service: Library Verify”).
24. Securely package the library enclosure that was replaced, and return to repair center.

9 Troubleshooting

9.1 Installation problems

Problems encountered during the installation of the library are usually caused by improper SCSI bus configuration, application software configuration errors, or an incorrectly configured operating system. If the application software that you are using is not communicating with the library after installation, check the following:

- **SCSI ID:** The library uses a single SCSI ID. Depending on other devices attached to the same SCSI bus and their SCSI IDs, you may need to change the SCSI ID of the library or tape drive before you can use the library. Review the manuals for the other devices on the SCSI bus or your operating system to determine which SCSI IDs are currently in use.
- **LUN Scanning:** use dual LUNs to control the tape drive (LUN 0) and library robotic (LUN 1). These models require an HBA that supports LUN scanning and LUN scanning must be enabled.
- **SCSI Cabling:** Verify that all SCSI cables are securely connected at both ends. Check the length and integrity of your SCSI cabling. Check the SCSI connector for bent pins. The length of the internal SCSI cabling inside the library is 2 feet (60 cm). This length must be included in any calculations of cable length.
  - For LVD SCSI the maximum length for a single device is 82 feet (25 meters). For multiple devices, the maximum combined internal/external length is 40 feet (12 meters).
  - If you have a combination of LVD and SE devices on the bus, the maximum cable length reverts to the SE specification, which for Ultra devices is 10 feet (3 meters) for four or fewer devices, and 5 feet (1.5 meters) for more than four devices.
- **Termination:** If the library is the only SCSI device — other than the SCSI host adapter — on the selected SCSI bus, it must be terminated. Likewise, if the library is physically the last SCSI device on the SCSI bus, it must be terminated. Only the devices physically located at the beginning and end of the SCSI bus should be terminated. Refer to the manuals supplied with other devices on the SCSI bus for information on enabling or disabling termination on those devices.
  - To terminate the library, locate the terminator in the accessories package and press it firmly into either of the two SCSI connectors on the back panel of the library. Secure the terminator by tightening the finger-screws until snug. The supplied terminator is “dual mode” and will work on both Low-Voltage Differential (LVD) and Single Ended (SE) SCSI buses. Check all SCSI and power connections and confirm that the unit is attached to a valid SCSI SE or LVDS bus.

Compatibility: Ensure that the library is compatible with the SCSI host adapter and backup application you plan to use. For a list of compatible SCSI adapters and application software, check with your SCSI host adapter manufacturer or backup application vendor.

NOTE: The host bus adapter for the library should be SCSI-3 LVDS. A single-ended SCSI host bus adapter will severely degrade performance. Also, if there are any SE devices on the same SCSI bus, the entire SCSI bus will negotiate down to SE speed and severely degrade performance.

- **SCSI Host Adapter Installation:** Verify that your SCSI host adapter is installed correctly. Refer to the manual that came with your SCSI host adapter for installation and troubleshooting instructions. Pay particular attention to any steps describing the settings of various jumpers and/or switches on the host adapter, if applicable. Make sure that the host adapter is properly seated in the motherboard slot and the operating system correctly detects the host adapter. Make sure that the proper device driver is installed for the SCSI host adapter.
- **Backup Application Installation:** Refer to the documentation included with your backup application for instructions on how to verify proper installation. Some backup software packages require an additional module to communicate with the library robotics.

- **Device Driver Installation:** Make sure that the proper device driver, if applicable, is installed for the library. Contact your support representative for more information.

NOTE: Many backup applications use their own drivers for the library and drive. Before installing a driver, make sure it will not be in conflict with the software.

9.2 Troubleshooting table

Table 9 Troubleshooting table

Problem	Solution
Power	
Library does not power on	■ Check all power cord connections. ■ Make sure the power switch on the front panel is in the ON position. ■ Make sure there is power to the outlet. Try another working outlet. ■ Replace the power cord. ■ Contact your service representative.
No display messages appear	■ Make sure the power cord is connected. ■ Make sure the power switch is on. ■ Power cycle the library. ■ Download library firmware. ■ Contact your service representative.
Tape Movement	
Tape stuck in drive	■ Power cycle the library, allow it to complete initialization, which in rare cases can take as long as 10 minutes, and then retry unloading the tape using the library operator control panel. ■ Allow the tape drive to complete all operations. This may take as long as ten minutes if you reset or cycle power on the library while the cartridge is positioned at the physical end of the media. ■ Make sure that the backup software is not reserving the slot or preventing the tape drive from ejecting the cartridge. The backup software needs to cancel the reservation and any hold it has on the tape drive. Temporarily disconnecting the library from the host server and power cycling eliminates the host and its software as a problem source. ■ Contact your service representative.
Tape stuck in storage slot	See "Removing stuck tapes from slots" on page 62.
Media	
Cleaning or data cartridge incompatible with drive.	Make sure you are using data and cleaning cartridges that are compatible with the drive and model of your library. The library automatically unloads incompatible cartridges, the Media Attention LED flashes, and an exclamation mark (!) is displayed in the inventory display for the indicated slot number. Export the media in order to clear the state.

Cannot write to or read from tape.	■ Make sure that the cartridge is write enabled (move the write-protect switch to the enabled position). ■ Make sure you have the appropriate data cartridge for your library model. ■ Make sure you are using an Ultrium cartridge that has not been degaussed. Do not degauss Ultrium cartridges. ■ Make sure that the cartridge has not been exposed to harsh environmental or electrical conditions and is not physically damaged in any way. ■ Many backup applications do not read or write to cartridges that were created using a different backup application. In this case, you may have to perform an erase, format, or label operation on the cartridge. ■ Make sure you understand any data protection or overwrite protection schemes that your backup application may be using, which could prevent you from writing to a given cartridge. ■ Retry the operation with a different, known good tape. ■ Clean the tape drive. See "Cleaning the tape drive" on page 50.
Cleaning	
Cannot load the cleaning cartridge	■ Make sure you are using an Ultrium universal cleaning cartridge. (See"Cleaning the tape drive" on page 50.) ■ Contact your service representative.
Errors Displayed on Front Panel	
"!" in library operator panel inventory display	See "Operator control panel (OCP) overview" on page 38 for more information.
There is an error code on the LCD	Look up the error code, try to resolve the failure, and power cycle (see "Tape library error codes" on page 66).
SCSI ID	
Changed drive SCSI ID, but the host server does not recognize the new ID	■ Make sure that all SCSI devices on the same bus have unique ID numbers. ■ If the SCSI bus is narrow (50-pin) only SCSI IDs 0 through 7 are available. ■ Make sure that you cycle power on the library after changing the SCSI ID. ■ Reboot the host server. Tape library Performance The library is not efficiently backing up data. ■ Make sure the library and tape drive are on their own SCSI bus and not daisy-chained to another tape drive or to the hard drive being backed up. ■ Make sure the library is connected to a LVDS SCSI bus and there are no SE devices on the same bus, because this will cause the entire bus to negotiate down to SE speed. ■ Use an Ultra320 SCSI bus and high-quality cabling with the library. ■ Do not connect the library to a narrow SCSI bus.

Bad performance	
	■ Try a new cartridge. A marginal cartridge can cause performance problems due to bad spots on the tape requiring retries. ■ Backing up data that compresses poorly or is already compressed will lower performance. ■ Check the size of the files. Small file size can impact performance. ■ Confirm that the backup application is utilizing block sizes of at least 32KB, preferably 64KB. Refer to the backup application documentation for details. ■ Check the network bandwidth from the host computer. If you are backing up data over a network, consider comparing to a local-only backup. ■ Make sure the backup server has enough memory to handle the bandwidth of the backup or restore. ■ Clean the tape drive. See "Cleaning the tape drive" on page 50 for instructions.
Media Attention LED Issues	
Contamination by loose debris.	Avoid contamination by ensuring that the library is installed in a clean, contamination-free environment. Cartridges should be stored vertically in their plastic cases. Continue cleaning the tape drive as needed.
Non-acclimated media	A cartridge should be acclimated for at least 24 hours before being used, particularly if it has been stored at a substantially different temperature or level of humidity than the library.
Cartridge is incompatible	Use only cartridges that are compatible with the drive type. ■ Make sure you are using an Ultrium universal cleaning cartridge. (See "Cleaning the tape drive" on page 50.)
Expired cleaning cartridge	A cleaning cartridge is good for Ultrium universal libraries: 50 cleans
Bad/defective/contaminated media	If the Media Attention LED is cleared and –although the drive has been cleaned - immediately re-displays each time a particular cartridge is reloaded that cartridge should be suspected as being defective., ■ Export the cartridge and load a known good cartridge. In some cases, a cartridge can be worn out, have a defective Cartridge Memory, or have been formatted as a Firmware Upgrade Cartridge. ■ Any cartridge that is suspected of being defective or contaminated should NOT be reused in any drive.

Device Not Detected on SCSI Bus	
Connected to a high voltage differential SCSI bus/host adapter	■ Attach device to a LVDS SCSI host adapter/bus. ■ SCSI cable length exceeded, use shorter cable, or removes other devices from the bus. ■ Check for conflicting SCSI IDs. ■ Check that the HBA supports LUN scanning and this feature is enabled.

- Device not properly terminated. See "Installation problems" on page 58.
- Power on device before powering on the host computer.
- Check that the device has been powered on and is not in an error state.
- Check the SCSI connector for bent pins.

9.3 Service Procedures

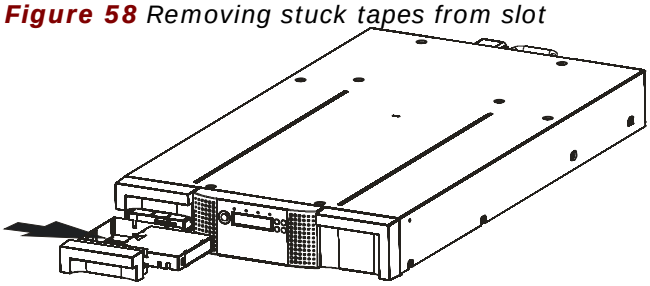
Removing stuck tapes from slots

NOTE: Contact your PIVOTSTOR, LLC support representative if a cartridge is stuck in the drive. In the event of a severe mechanical problem with the library or if circumstances require you to remove tape cartridges, do the following.

If the Operator Control Panel or the Remote Management Unit is still operational:

1. Move the tapes from the drive(s) to the magazines using the **Move Tape** command, or the **Forced Drive Eject** command. See" Moving tapes in the library" on page 46.
2. Use the magazine removal process to release the magazine and remove it from the library (see figure 62). To use the operator control panel, see" Unlocking, removing and replacing magazines" on page 47. To use the RMU, see "Releasing and replacing magazines" on page 47.

Figure 58 *Removing stuck tapes from slot*



Removing and replacing a magazine using the OCP

CAUTION: The magazine must only be removed manually in an emergency. Failure to follow normal procedure can cause data loss and equipment damage.

The magazines should be released using the Operator Control Panel (OCP) or the Remote Management Unit (RMU). Recommends that you release the magazine using the OCP or RMU, however, if the OCP process fails, or if the magazine needs to be removed when the power to the tape library is off, you can manually release the magazines.

This OCP option lets you gain access to the left and right magazine. Access to the magazines requires the use of the Administrative password.

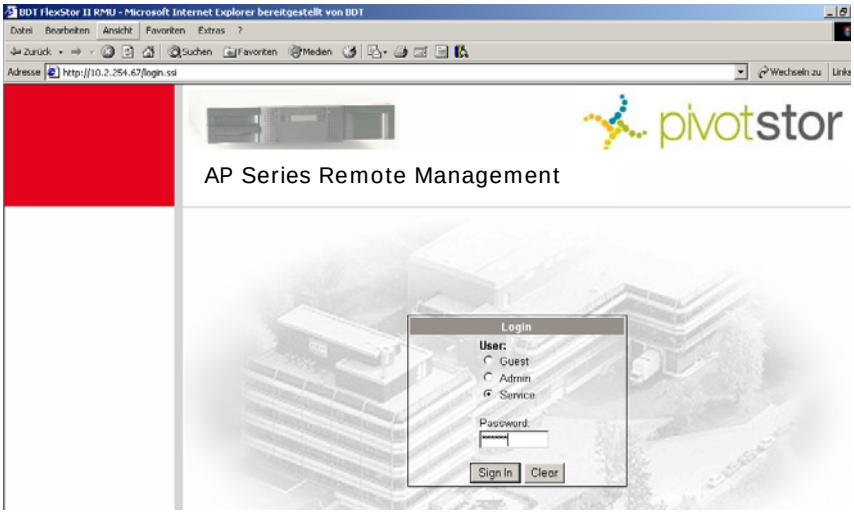
To remove a magazine:

1. From the Home screen, press Previous or Next on the OCP until the screen displays Operations.
2. Press Enter to select.
3. Press Previous or Next until the screen displays either Unlock Left Magazine, or Unlock Right Magazine.
4. Press Enter to select the desired magazine to unlock.
5. Enter the Administrative password if requested.
6. The display will read Left Magazine Unlocked, or Right Magazine Unlocked.
7. Pull the released magazine out of the library.
8. The screen will now display Insert Left Magazine, or Insert Right Magazine. The library cannot perform any other operation until the magazine is replaced. After exchanging tapes in a magazine, slide the magazine completely into the library. The magazine will lock into place once it is correctly installed and the library will inventory the magazine.

Using the remote management unit

To login, enter the correct password, and press **Enter.**

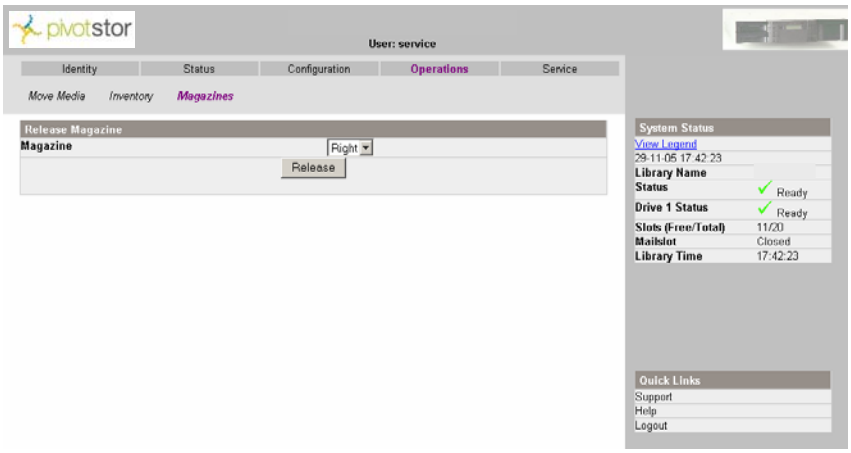
Figure 59 *RMU login page*



Go to **Operations > Magazines**.

This page allows the user to release the right or left magazine from the library.

Figure 60 *Operations: Magazines page*



Magazine emergency release

If the directions in Steps 1 and 2 above do not allow you to remove the tapes, do the following:

1. Unplug the power cord from the library.
2. Find the access holes for the right and left magazines. See Figure 64.

Figure 61 *Access holes for the left and right magazine*

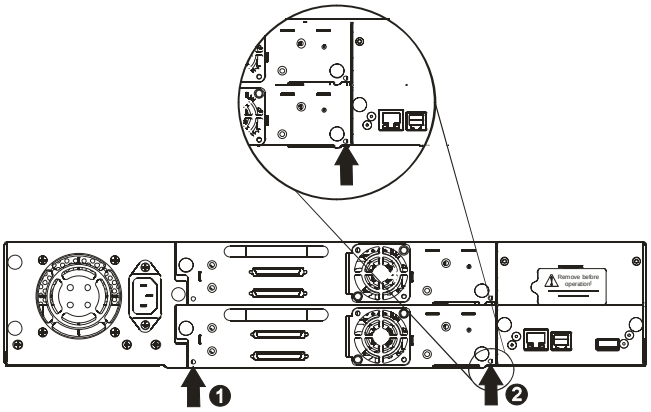


Table 10 *Access to manually release a magazine*

Number	Description
1	Right magazine release
2	Left magazine release

3. To manually release the magazines, push the end of a straightened paper clip into the access hole for each magazine at the back of the library. While holding the paper clip, have a second person pull the magazine out of the front of the unit. See Figure 55.

Figure 62 Releasing the magazine

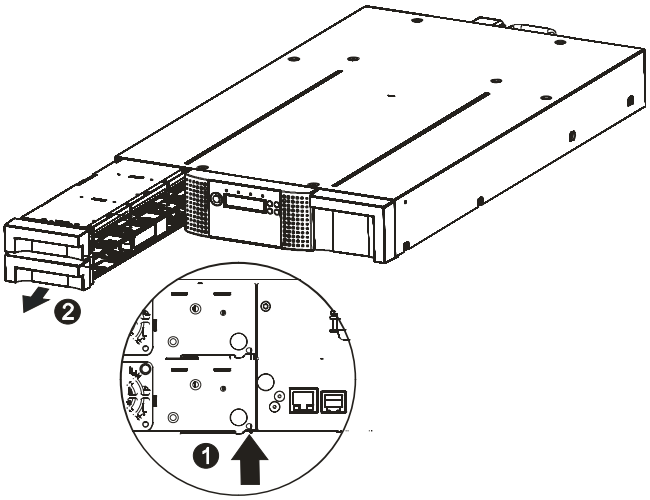


Table 11 *Removing the left magazine*

Step	Process
1	Insert pin into access hole
2	Release and remove magazine

4. If there are additional tapes still in the library, or if you were unable to manually remove the magazines and drive, contact service for further instructions.

9.4 Tape library error codes

If an error occurs during operation of the library, the library stops the current operation and displays an error code on the LCD screen. Unless otherwise noted in Table 11 on page 67, try to resolve the error by cycling power to the library and retrying the last operation. If the error persists, contact support personnel Support menu tree.

Example error code

EVENT -6
A5 F1
Where:

- Sequence number –6 indicates the position in sequence list, 0 being the most recent.
- Log shows a load error (code A5 = fan error, sub code F1 = caused by the fan at the back connector plate).

The event log with the library also includes a date stamp for each event. Press Enter to display the associated timestamp in the following format:
ddd:hh:mm:ss:HH
where:
ddd: days
hh: hours
mm: minutes
ss: seconds
HH: 1/100 second

A description of each error code and possible solution is provided in the following table

Table 12 *Main Error codes*

Error Code	Description	User Action
80	Barcode Reader Error, cannot initialize BCR	Retry operation; after several occurrences contact technical support
81	Barcode Reader Error, no response from BCR	Retry operation; after several occurrences contact technical support
82	EEPROM Error, no response from EEPROM (located on robotic controller)	Retry operation; after several occurrences contact technical support
83	Robotic controller generic problem	Reset the unit and retry operation. After several occurrences contact technical support
84	Setting of gripper motor parameters failed	Reset the unit and retry operation. After several occurrences contact technical support
85	Setting of slider motor parameters failed	Reset the unit and retry operation. After several occurrences contact technical support
86	Setting of elevator motor parameters failed	Reset the unit and retry operation. After several occurrences contact technical support
87	Setting of rotation motor parameters failed	Reset the unit and retry operation. After several occurrences contact technical support
88	Setting of sled motor parameters failed	Reset the unit and retry operation. After several occurrences contact technical support
89	Gripper blocked	Run ‘Library Health Check’, after several occurrences contact technical support
8A	Slider blocked	Run ‘Library Health Check’, after several occurrences contact technical support
8B	Elevator blocked	Run ‘Library Health Check’, after several occurrences contact technical support
8C	Rotation blocked	Run ‘Library Health Check’, after several occurrences contact technical support

8D	Sled blocked	Run ‘Library Health Check’, after several occurrences contact technical support
8E	Cannot find gripper block within the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
8F	Cannot find slider block within the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
90	Cannot find elevator block within the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
91	Cannot find rotation block within the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
92	Cannot find sled block within the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
93	Gripper outside range, Gripper has reached a position beyond the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
94	Slider outside range, Slider has reached a position beyond the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
95	Elevator outside range, Elevator has reached a position beyond the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
96	Rotation outside range, Rotation has reached a position beyond the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
97	Sled outside range, Sled has reached a position beyond the expected range	Run ‘Library Health Check’, after several occurrences contact technical support
98	Cartridge present sensor not found	Run ‘Library Health Check’, after several occurrences contact technical support
99	Slider home sensor not found	Run ‘Library Health Check’, after several occurrences contact technical support

9A	Rotation home sensor not found	Run ‘Library Health Check’, after several occurrences contact technical support
9B	Sled position sensor not found	Run ‘Library Health Check’, after several occurrences contact technical support
9C	Gripper range out of specification	Run ‘Library Health Check’, after several occurrences contact technical support
9D	Slider range out of specification	Run ‘Library Health Check’, after several occurrences contact technical support
9E	Elevator range out of specification	Run ‘Library Health Check’, after several occurrences contact technical support
9F	Rotation range out of specification	Run ‘Library Health Check’, after several occurrences contact technical support
A0	Sled range out of specification	Run ‘Library Health Check’, after several occurrences contact technical support
A1	Open Mail Slot (Import/Export Element) failed	Retry operation, after several occurrences contact technical support
B0	Robotic controller response timeout. A command did not complete in the required amount of time.	Reset the unit and retry operation. After several occurrences contact technical support
B1	NACK received from robotic controller	Reset the unit and retry operation. After several occurrences contact technical support
B2	Robotic controller communication failed	Reset the unit and retry operation. After several occurrences contact technical support
B3	Robotic controller urgent stop due to a released magazine	Check if magazine are completely inserted and retry operation. After several occurrences contact technical support
B4	Cartridge did not transport completely Gripper could not pick cartridge and CP sensor not present After pushing the cart CP sensor still present	

B5	Robotic controller does respond on command	Reset the unit and retry operation. After several occurrences contact technical support
C0	Network initialization failed	Check network cable and network configuration. If the error recurs, contact technical support
C1	Telnet Interface initialization failed	Check network cable and network configuration. If the error recurs, contact technical support
C2	Webserver initialization failed	Check network cable and network configuration. If the error recurs, contact technical support
C6	Ping command did not reached target	Check network cable and network configuration. If the error recurs, contact technical support
C7	Cannot Upgrade from USB	Retry of Firmware upgrade, if not successful contact technical support
D0	ROM error. ROM checksum incorrect	Retry of Firmware upgrade, if not successful contact technical support
D1	RAM error. Power on Self Test (POST) has failed,	Retry operation; after several occurrences contact technical support
D2	NVRAM error. R/W operation to NVRAM has failed	Retry operation; after several occurrences contact technical support
D5	Display Error Communication to display failed	Retry operation; after several occurrences contact technical support
D7	Fatal system error	Retry operation; after several occurrences contact technical support
D8	Data base error	Retry operation; after several occurrences contact technical support
D9	No SCSI IC detected	Retry operation; after several occurrences contact technical support
DA	In Wellness Test the barcode reader has read different barcode data for the same cartridge label	Check barcode label on scratch cartridge and run ‘Library Health Check’again. If the error recurs, contact technical support

DB	External cooling fan error (fan motion has stopped). The subcode indicates which drive sled fan is affected	Check if the indicated fan is operational and not obstructed. If the error persists, contact technical support
F0	Drive Overtemperature Condition Subcode 00: drive sled #1 Subcode 01: drive sled #2	Check ambient temperature conditions and check all fans, after several occurrences contact technical support
F1	Drive Communication Error, Library controller has lost communication to drive Subcode 00: drive sled #1 Subcode 01: drive sled #2	Retry operation; if not successful contact technical support
F2	Drive Sled not present Subcode 00: drive sled #1 Subcode 01: drive sled #2	Retry operation; if not successful contact technical support
F3	Drive Hardware Error	Cycle Power, after several occurrences contact technical support
F4	Drive Load Timeout Drive has run in a timeout while loading a tape	Retry operation; if not successful contact technical support
F5	Drive Unload Timeout Drive has run in a timeout while unloading a tape	Retry operation; if not successful contact technical support

10 Technical specifications

10.1 Physical AP Series tape library specifications

Table 13 AP Series tape library physical specifications

Characteristics	Product alone	Packaged
Height	87.6 mm	248 mm
Width	447.5 mm	598 mm
Depth	740 mm	993 mm (max.)
Weight	Appr. 18 kg (1 full height drive)	18.5 kg (1 full height drive, accessories: power cord, CD, Quick Start Guide)

10.2 Tape library operation specifications

Table 14 Operation specifications

Characteristics	Specification
AP Series TL2000 2U tape library with LTO3 half height drive(s)	
Maximum storage capacity (24 data cartridges)	Native: 9.6 TB Compressed: 19.2 TB (assuming 2:1 compression)
Maximum data transfer rate	Native: 60 MB/s (216 GB/hr.) Compressed: 120 MB/s (432 GB/hr.) (assuming 2:1 compression)
Drive type	LTO3 half height drive (1 or 2)
Number of slots	24 (including mailslot)
MSBF	1,000,000 swaps
Interface	SCSI LVD/SE or SAS
AP Series TL2000 2U tape library with LTO3 full height SCSI drive	
Maximum storage capacity (24 data cartridges)	Native: 9.6 TB Compressed: 19.2 TB (assuming 2:1 compression)
Maximum data transfer rate	Native: 80 MB/s (288 GB/hour) Compressed:160 MB/s (576 GB/hour (2:1 compression)
Drive type	LTO3 full height SCSI drive
Number of slots	24 (including mailslot)
MSBF	1,000,000 swaps
Interface	Ultra160 or 320 SCSI LVD (drive dependent)

AP Series TL2000 2U tape library with LTO3 full height FC drive	
Maximum storage capacity (24 data cartridges)	Native: 9.6 TB Compressed: 19.2 TB (assuming 2:1 compression)

Maximum data transfer rate	Native: 80 MB/s (288 GB/hr.) Compressed: 160 MB/s (576 GB/hr.) (2:1 compression)
Drive type	LTO3 full height FC drive
Number of slots	24 (including mailslot)
MSBF	1,000,000 swaps
Interface	Fibre Channel (FC) 2 Gb/s

10.3 Environmental specifications

Table 15 *Tape library Environmental Specifications*

Characteristic	**Specification**
Temperature	
Operating	10º to 35º C
Non-operating	-30º to 60º C
Temperature shock immunity - maximum rate of change	10º C per hour
Humidity	
Operating	20% to 80% RH non-condensing
Non-operating	20% to 80% RH non-condensing

11 Regulatory Information

This section describes the tape library compliance with safety and regulatory agency standards

IMPORTANT To comply with the following regulations and standards, the tape library must be properly installed in an office or industrial environment with shielded cables and adequate grounding of the SCSI bus and the input power.

Countries	Standard (by PIVOTSTOR, LLC)	European Union USA/Canada Germany	CE FCC, CSAus TÜV/GS

Device Standards

- ANSI Small Computer System Interface-2 (SCSI-2), X3.131 – 1994
- ANSI SCSI-3 Primary Commands, X3.301 - 1997
- ANSI Information and Technology. SCSI-3 Medium Changer Commands (SMC), NCITS.314:1998
- ANSI SCSI Parallel Interface-2 (SIP-2), X3.302:1998
- IEC 60297 Rack Standards

FCC (United States)

The computer equipment described in this manual generates and uses radio frequency (RF) energy. If the equipment is not installed and operated in strict accordance with the manufacturer's instructions, interference to radio and television reception might result.

Tested To Comply
With FCC Standards
For Home or Office Use

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Part 15, Class A, of the FCC Rules, is designed to provide reasonable protection against radio and television interference in a residential installation. Although the equipment has been tested and found to comply with the allowed RF emission limits, as specified in the above cited Rules, there is no guarantee that interference will not occur in a particular installation. Interference can be determined by turning the equipment off and on while monitoring radio or television reception. The user may be able to eliminate any interference by implementing one or more of the following measures:

- Reorient the affected device and/or its receiving antenna.
- Increase the distance between the affected device and the computer equipment.
- Plug the computer and its peripherals into a different branch circuit from that used by the affected device.
- If necessary, consult an experienced radio/television technician for additional suggestions.

Canadian Verification

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations (ICES-003, Class A).

CE Notice

This AP Series product conforms to the following European Directive(s) and Standard(s): Application of Council Directives: 73/23/EEC, 89/336/EEC. Standards to which Conformity is declared: EN60950, EN55022, EN55024, EN61000-3-2, EN61000-3-3.

VCCI

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

12 Index

B

Barcode reader *36*

C

CANCEL button, location 15
CE Notice 78
Changing
  Drive configuration, RMU 44
  Network configuration, RMU 44
  Password 45
  System configuration, RMU 43
Cleaning problems 62
Cleaning tape drive 52

D

Determine
  Media inventory 48
Diagnostic page 50
Drive cleaning *34*

E

Electrostatic discharge 13, 53
ENTER button, location 15
Error codes 70

F

FCC Notice 77
Firmware 50

I

Input Modes 27
Installing the library
  Power connection 22
  Rackmounting 20
  SCSI connection 23
  Unpacking 17
Interaction Mode
  Configuration *32*
  Inventory 31
  Service *33*
  Status Information 30

L

LED description 15, 27
Library 70
LUN 12, 60

N

NEXT button, location 15

O

Operator Control Panel 14, 25
  Back overview 16
  Components 14
  Menues 29
  User interaction mode 30

P

Power button 14
Power cable
  Remove 56
  Replace 56
Power cord 22, 23
Power-On-Self-Test 24
PREVIOUS button, location 15

R

Rack stability 5
Rebooting library 51
Release magazine 49, 68
Remote Management Unit (RMU) 39
Remove
  Library controler 57
  magazine *36*
  tape drive 54
Removing a magazine
  Using Remote Management Interface 67
Removing stuck tapes 65
Replace
  library controler 57
Restoring factory defaults 48
RMU
  Login 40
  Status icons 40

S

Safety instructions 4
SCSI
  Bus 12
  Cable 60
  Device 12, 60
Setting
  Date/time 46
  Error log mode 47
  Event parameters 47
Shipping lock 18
Slot numbering 38
Software packages 13
Specifications 75
Storage
  Capacity 11
  Conditions 5, 17

T

Tape cartridge
  Handling 34
  Insert into magazine *38*
  Labeling 35
  Move within library 48

Type 34
Write protection *36*
Termination 13
Troubleshooting table 61

V

View
drive information, RMU 41
Drive information,RMU 42
library logs 51
Llibrary information, RMU 42
Tape inventory,RMU 43

W

Writing problems 62